

## 1997 ANNUAL REPORT

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Strategic Planning Division

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F/A-18F launched from the USS *John C. Stennis* (CVN74)

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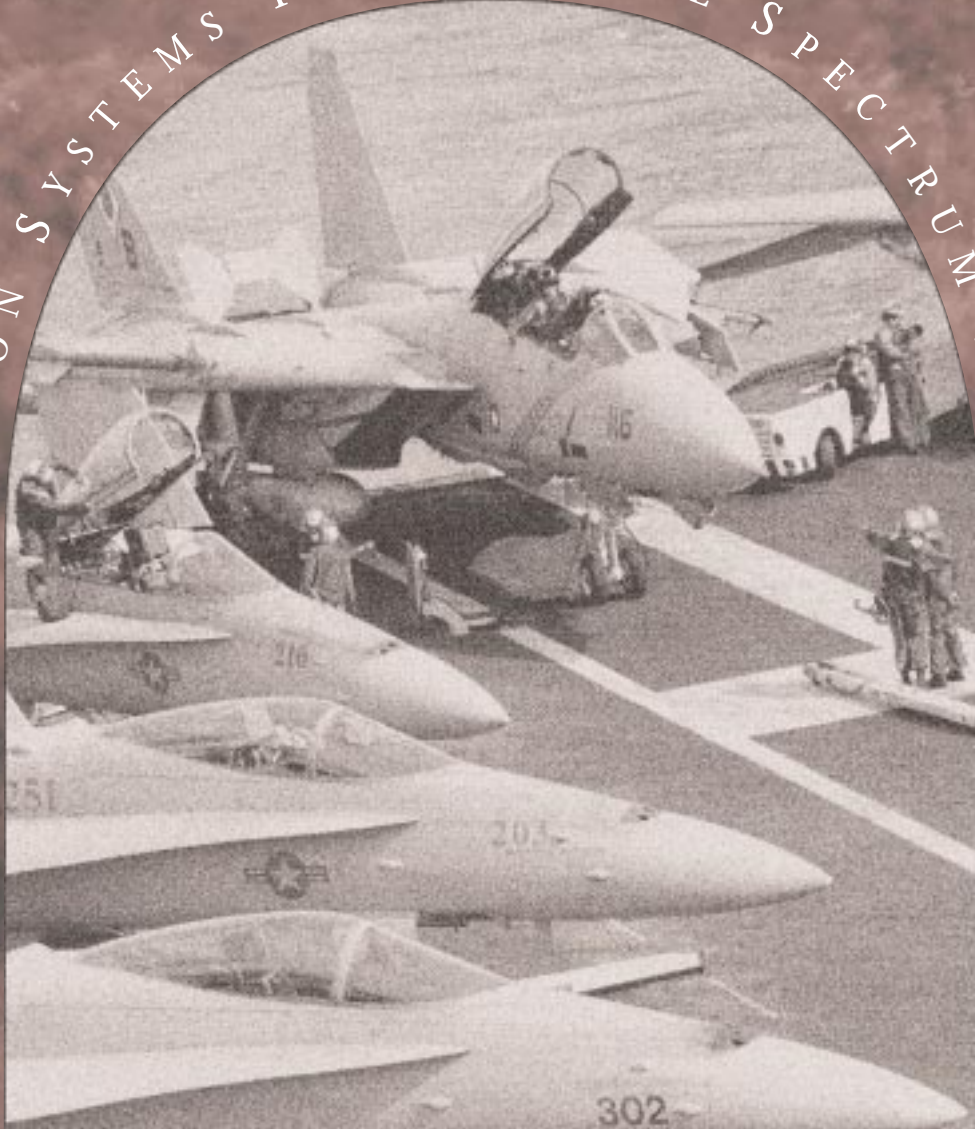
NAVAL AVIATION SYSTEMS TEAM

NAVAL AVIATION

SYSTEMS TEAM

FULL SPECTRUM

FLEET SUPPORT



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## V A D M L o c k a r d

I am pleased to report that in 1997, the Naval Aviation Systems Team (TEAM) continued to deliver improved performance across its entire range of fleet support responsibilities.



The 1997 Annual Report showcases our efforts to meet and exceed customer expectations, effect large-scale cost reductions, and increase corporate efficiency across the board. It also illustrates a steadfast commitment to our long-standing mission – to develop, acquire and support technologically superior air power well-matched to the needs of our Navy and Marine Corps forces.

We execute five core processes on behalf of our customers: Acquisition Management, Test and Evaluation, Repair/Modification, In-Service Engineering, and Research and Development. Within each of these areas, we continue to measure our success in terms of customer-perceived value. In today's era of limited resources, aging equipment and the requirement to deliver more with less, value means giving our customers the high quality, high performance systems they need, on time and at a price they can afford.

Using customer priorities as our guide, we have virtually reinvented ourselves – reducing the size of our organization, consolidating our capabilities, streamlining our processes and broadening our commitment to Acquisition Reform. We are capitalizing on the strengths of the private sector, while retaining ownership of the core capabilities required to perform our unique mission.

We continue to pursue initiatives aimed at reducing the total ownership cost of our systems – implementing reform in a controlled manner to ensure readiness and safety are protected. Ultimately, our goal is the same as that of our customers – to reconstitute the Fleet's assets with new and modernized weapons systems, technically and functionally capable of responding to the demands of the 21<sup>st</sup> century.

I am very proud of the results our TEAM has achieved over the past year. We have a positive story to tell, but are far from finished. As we look to the future, we have the potential to effect landmark improvements across the entire acquisition enterprise by cultivating the smart integration of fleet, industry and TEAM capabilities.

This report makes it clear that our organization, although geographically dispersed with many unique elements and responsibilities, truly represents a fully integrated, product and customer focused team. Together, alongside our industry partners, we stand ready to take on the future. And to us, the future looks bright.



## MISSION

The Naval Aviation Systems TEAM's unique mission is to serve the Navy and the Nation by developing, acquiring and supporting aircraft and related systems which can be operated and sustained at sea.

## PRODUCTS AND SERVICES

The TEAM's products and services include: Aircraft, avionics, air-launched weapons, electronic warfare systems, cruise missiles, unmanned aerial vehicles, launch and arresting gear, training equipment and facilities, and all other equipment related to Navy and Marine Corps air power.

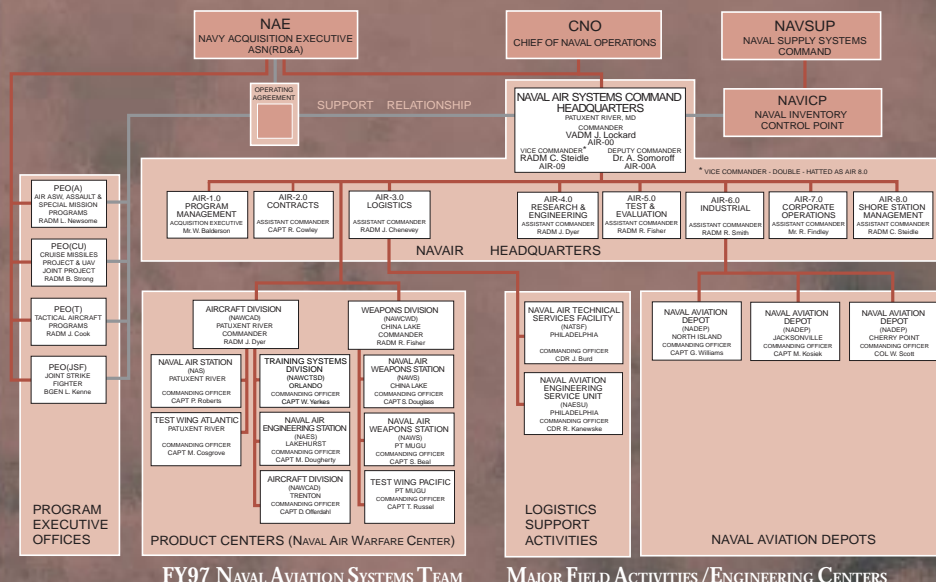
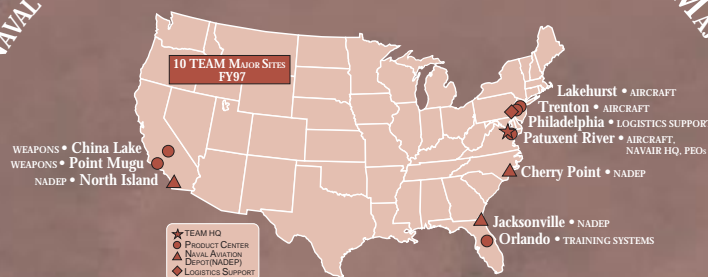
Total life cycle support of all naval aviation weapons systems includes: research, design, development and engineering; acquisition; test and evaluation; training facilities and equipment; repair and modification; and in-service engineering and logistics support.

## ORGANIZATIONAL STRUCTURE

The TEAM is comprised of six elements working as a fully coordinated team (see chart): the Naval Air Systems Command (NAVAIR), the Naval Inventory Control Point (NAVICP), and four naval aviation Program Executive Offices (PEOs).

The PEOs are responsible for the acquisition and full life cycle management of most of the aircraft and weapons used by the Fleet. NAVAIR (headquarters, product centers and naval aviation depots) oversees all weapons programs not managed by the PEOs, and provides all of the functional support the PEOs and their program management teams require including acquisition management, contracting, research and engineering, test and evaluation, logistics, industrial support, corporate operations and shore station management. NAVICP is responsible for providing spare and repair parts throughout the life cycle of all naval weapons systems. Together, the TEAM forms a successful partnership that is collectively dedicated to providing high quality, technologically superior and affordable products and support to the operating forces. While retaining core capabilities in-house, the TEAM executes most of its work (nearly 80 percent) within private industry.

# 1997 NAVAL AVIATION SYSTEMS TEAM • ORGANIZATION AND MAJOR SITES •



FY97 NAVAL AVIATION SYSTEMS TEAM

MAJOR FIELD ACTIVITIES / ENGINEERING CENTERS

## LEADERSHIP

Commander - VADM John A. Lockard  
 PEO(A) - RADM Larry Don Newsome  
 PEO(CU) - RADM Barton D. Strong  
 PEO(T) - RADM Jeffrey A. Cook  
 PEO(JSF) - Brig. Gen. Leslie F. Kenne (USAF)  
 NAVICP - RADM Raymond A. Archer, III

## PERSONNEL

Approximately 33,500 civilian and military within NAVAIR and the four PEOs

## FACILITIES

Currently located at ten major sites throughout the United States; reduces to eight sites by FY99

## PROGRAMS

Over 140 acquisition programs managed as of January 1998

## AIRCRAFT SUPPORTED

Over 4,100 active inventory, including 96 individual type/model/series

## PRINCIPAL CUSTOMERS

Operating forces of the Navy and Marine Corps, other activities of the U.S. Armed Forces and foreign allies

TEAM PROFILE

# AIRCRAFT DIVISION

## UNIQUE CAPABILITIES

The Aircraft Division has played out a national industrial strategy with investments in new laboratories and test facilities at Patuxent River. Our two newest facilities, the Cryogenics Engineering and Overhaul Facility and the High Performance Computing Center (HPCC) are prime examples. Additionally, the Aircraft Division is developing the Atomic Magneto-Optical Trapping laboratory to investigate features of matter-wave and cold atoms. Every dollar of investment is designed to be leveraged not only by existing programs, but also by future programs and non-traditional customers.

Engineering disciplines within the Aircraft Division include aircraft research, development, test and evaluation (RDT&E) at Patuxent River, MD; aircraft launch and recovery and ground support systems at Lakehurst, NJ; propulsion systems at Trenton, NJ; and training systems at Orlando, FL. Through teamwork, the Aircraft Division continues supporting the development of F/A-18E/F and V-22 aircraft and several aircraft receiving upgrades.

The Air Combat Environment Test and Evaluation Facility and the High Performance Computing Center are two examples of our modeling and simulation capability. The HPCC uses a 106 processor Silicon Graphics Power Challenge Array and will provide high fidelity modeling and simulation capabilities to other Aircraft Division laboratories and facilities. Since its conception, the HPCC has been an integral tool for the Joint Strike Fighter, Joint Theater Missile Defense-Attack Operations, F/A-18E/F, F/A-18C/D, EA-6B, F-14 and P-3 synthetic aperture radar programs. With the level of excellence we are achieving in modeling and simulation, the Aircraft Division is designated as a Distribution Center under the Department of Defense High Performance Computing Modernization Program.

## SYNERGY

The collocation of RDT&E personnel at Patuxent River has improved responsiveness and collaborative decision making to effect the prompt resolution of aircraft performance problems. Two recent success stories involved the Navy's T-2 trainer, grounded due to an uncommanded pitch problem, and the F/A-18E/F, which experienced "wing drop" (asymmetric lift) in some parts of the envelope. The ensuing engineering investigations benefitted from close and continuous coordination among all of the functional elements, representing a concentration of the best expertise the Navy has to offer.

In 1997, the Aircraft Division also participated in a variety of collaborative partnerships with other services, customers and industry:

- Developed new nonlinear optical polymers in collaboration with the Weapons Division, China Lake, and the Army for optical modulation and switching in photonics applications
- Conducted an evaluation of the newly installed wing tip refueling pods on the Air Force KC-135



AV-8B Harrier suspended in Anechoic Chamber

- Demonstrated jet engine component technology advances with the Air Force, which will result in a 23 percent reduction in fuel consumption for patrol, transport and rotary aircraft
- Designed, installed and successfully completed Developmental Test IIB flight test evaluation of an Improved Fresnel Lens Optical Landing System aboard USS *George Washington* (CVN73), and formed a partnership with Hughes Aircraft for manufacturing production systems
- Completed the SH-2G(E) Foreign Military Sales Egyptian purchase testing providing the SH-2G with enhanced capabilities
- Completed an extensive loads flight test program on an F/A-18 to support a McDonnell Douglas Aircraft FMS effort with Thailand
- Provided training to Finnish instructor pilots under an in-country departure demonstration program for the Finnish F-18

## PRODUCTS AND SERVICES DELIVERED

- Flew 20,290 flight hours during 1997 and provided over 940 hours of RDT&E aerial refueling support while passing 1.8 million gallons (12.4 million pounds) of fuel
- Continued flight testing using all seven of the F/A-18E/F test aircraft, exceeding 2,000 flight hours
- Conducted Phase I of Developmental Test IIB for first production EP-3 Special Sensor Improvement Program
- Performed Full Scale Developmental Test on the V-22 aircraft, accumulating more than 1,200 flight hours
- Conducted Developmental Test on the ES-3A Communications Improvement Program and the SH-60B Armed Helo Rapid Deployment program
- Conducted 64 catapult launches and arrested landings of the F/A-18E/F test aircraft during initial sea trials on the USS *John C. Stennis* (CVN74)
- Completed E-6B Airborne Command Post baseline aircraft structural testing and E-2C satellite communication antenna aerodynamic and structural testing
- Manufactured, integrated, installed and tested the Counter Drug Optical Upgrade, a third generation Forward Looking Infrared System on a P-3C aircraft
- Completed a Marine Corps exercise to demonstrate the capability of the UH-1N to function in a Forward Observer/Forward Air Controller role while employing a data link to provide targeting information to shooters

- Procured, tested and installed in the CH-53D, energy-absorbing seats designed to reduce fatalities and serious injuries during helicopter mishaps
- Graduated 64 pilots, naval flight officers and civilian engineers from the U.S. Naval Test Pilot School
- Successfully completed the first three Developmental

Test firings of the Standoff Land Attack Missile Expanded Response

- Developed and tested an innovative method to stabilize missile seeker platforms, which increases line-of-sight pointing responsiveness and reduces logistics and acquisition costs by 30 percent

## AWARDS AND ACCOMPLISHMENTS

- The Logistics Group NAV/Plan team received a Defense Certificate of Recognition for Acquisition Innovation. Through a government and industry partnership, the NAV/Plan maintenance planning tool was designed to develop maintenance plans for commercial and non-development items, normally procured under severe data constraints.
- The Aircraft Division was recognized by the Under Secretary

of Defense for Environmental Security for conducting a paintless aircraft study in support of the Joint Strike Fighter program. The study involved covering an F/A-18 aircraft with "appliqué" material instead of paint and monitoring the durability and compatibility of the material in the naval tactical aircraft environment.

- The Rotary Wing Aircraft Test Squadron received the David Packard Award for Acquisition Excellence for its work on the H-60 Armed Helo Integrated Program Team.
- Through the P-3 Anti-Surface Warfare (ASUW) Improvement Program, the Aircraft Division successfully demonstrated improved ASUW capabilities in numerous battlegroup exercises both locally and forward deployed, and successfully launched a *Maverick* missile against a fixed target during the recent Joint Fleet Exercise 97-3.
- The Aircraft Division was awarded a three year, \$14.7 million Advanced Linear Motor Advanced Technology Demonstrator (ATD) project, which will result in a full scale demonstration of a recovery system for next generation carriers.

AIRCRAFT DIVISION

# TRAINING SYSTEMS

## UNIQUE CAPABILITIES

The Training Systems Division (TSD) is the Navy's principal center for training systems research, development, test and evaluation, acquisition and product support. TSD also provides interservice coordination and training systems support for the Army and the Air Force and is recognized throughout the training community for its all-inclusive training systems technology expertise.

Principally located in Orlando, FL, TSD provides training devices that replicate, represent, simulate or stimulate the actual systems to provide trainees with "hands-on" experience without risk to lives or property, and without spending the thousands of dollars often required to operate actual weapons systems in the field.

The increased complexity of modern weapons and their support systems demands our men and women be thoroughly trained. Training is an investment in readiness and in the personal excellence of the men and women who must ultimately fight and win wars. These technologies allow smaller combat forces to perform far beyond expectations and enhance the effectiveness of training for a variety of roles and missions.

TSD specializes in front-end analysis (instructional systems design) of training system requirements; research in technologies and improved methods for simulation and training (e.g., distributed interactive simulation, modeling and simulation, electronic training environment and team training); and standards development for training systems, enabling common joint acceptance and documentation.

- The *Weapons Team Engagement Trainer* prototype provides realistic tactical engagements for team members of military special forces, SWAT teams and other law enforcement personnel in the areas of hostage rescue, terrorist confrontations, ambush response and close-quarter combat.
- The *Computer Improved Instructor's Training Aid*, a multi-media training aid which combines audio, text, video, animation and graphics, provides the instructor the ability to freeplay enhanced course materials on a classroom large screen and replaces traditional panels, wall charts, viewgraphs, hardware cutaways and models.
- The *Virtual Environment for Submarine Ship Handling and Piloting Training* utilizes a Silicon Graphics Onyx computer, state-of-the-art head-mounted displays, and a speaker-independent speech controlled interface to create an interactive, harbor-based shiphandling task.
- The *Electronic Training Environment Program* supports delivery of on-demand quality training anywhere naval personnel are stationed by integrating a variety of proven technologies to enhance training opportunities in the schoolhouse, the workplace ashore or the workplace at sea.



Aviation Team Training

## TECHNOLOGY TRANSFER

Technology transfer provides significant benefits to federal agencies, state and local governments, and public and private organizations, while optimizing taxpayer dollars and mutually beneficial partnership agreements. Examples include:

- Interservice coordination and training systems support for Marine Corps, Army, Air Force and Coast Guard
- Partnering with industry and academia in simulation and training initiatives such as the Technology Reinvestment Program
- Implementing White House initiatives to commercialize defense simulation and training technologies
- Coordination and training systems support for international customers
- Commercialization of the Weapons Team Engagement Trainer
- Use of PC-based image generator technology for prototype training systems
- Commercialization of the prototype *3-Defender* interactive simulation into a production-quality, marketable shoot/no shoot decision making training tool for law enforcement, military operations (other than war) and military security forces
- Joint engineering of TSD research projects and evaluation of commercial market potential by University of Central Florida students
- Interagency transfer of simulation, training, multimedia and computer-based instruction technologies with the Federal Aviation Administration and the National Institute of Justice

## PRODUCTS AND SERVICES DELIVERED

During 1997, TSD delivered major trainers, and provided front-end analysis and in-service engineering support for the Navy and Marine Corps aviation, surface and undersea communities, in addition to Coast Guard and other joint service projects.

Navy:

- E-2/C-2 Tactics trainers
- Aviation undergraduate naval flight officer Communication/Navigation trainers
- Electronic classrooms at NAS Pensacola

- Aviation Survival Training for a centrifuge-based environment trainer at NAS Lemoore
- UH-1N weapon system trainer
- Aviation Electrical Systems trainers for Naval Aviation Technical Training Center Aviation Electrician School
- Canopy and Ejection Seat trainers for the Naval Aviation

Technical Training Center  
Aviation Machinists (Egress)  
School

- EA-6B Operational Flight Navigation Trainer, Electronic Flight Instrument Systems, and Global Positioning System Simulation upgrade
- S-3B Tactics and Flight Trainer software rehost
- Mission Avionics Systems trainers (Basic, EP-3E, ES-3A configurations)

Marine Corps:

- AV-8B trainer modifications to armament maintenance radar configurations, instructional graphics training devices and an operational flight trainer rehost
- C-130 operational flight trainer rehosts

Relocated trainers:

- Naval Aviation Technical Training Center aviation school trainers from Memphis, TN, to Pensacola, FL
- F-14D Mission Flight trainer from Miramar, CA, to Oceana, VA
- P-3C Operational Flight trainer from Moffett Field, CA, to Whidbey Island, WA

## AWARDS AND ACCOMPLISHMENTS

- Received Federal Laboratory Consortium Award for Excellence in Technology Transfer
- Designated as the lead for Authoring Instructional Materials Programs and Automated Classrooms by Chief of Naval Education and Training
- Designated as the lead for Live Test Fire and Evaluation Program by Deputy Under Secretary of Defense Test and Evaluation
- Designated as the lead for the LPD-17 Total Ship Training Program by Program Manager Surface (PMS-317)
- Designated as the principal development agent for the Marine Corps advance amphibious assault vehicle, embedded training methodology for Information Technology 21, and the Joint Maritime Communications and Information System

## PRODUCTS AND SERVICES AT A GLANCE

Training Systems RDT&E, Acquisition and Product Support  
Instructional Systems Design of Training System Requirements  
Research in Technologies and Improved Simulation and Training Methodologies  
Standards Development for Training Systems  
Multimedia Training Aids  
Simulation and Training Technology Transfer



# WEAPONS DIVISION

## UNIQUE CAPABILITIES

The Weapons Division is the source of an extraordinary range of essential products and services provided for Navy and Department of Defense (DOD) customers. No other DOD location is able to duplicate the Weapons Division's land, sea, airspace, laboratory and range assets with the lack of encroachment found in test spaces at China Lake and Point Mugu, CA, and White Sands, NM. The 1,700 square miles of China Lake's restricted land and airspace—surrounded by 20,000 square miles of the joint-service R-2508 military-use airspace—enables unrestricted aircraft operations and experimentation with hazardous and classified materials. The site also hosts approximately 3,000 major test events per year. At Point Mugu, about 1,300 test events are completed annually on the 36,000 square mile Sea Range (expandable to 125,000 miles for larger operations). The Sea Range is overlain by restricted military air space, and the FAA-approved IR 200 connects that airspace with restricted area R-2508 to allow large, complex, air-land-sea test and training scenarios. Together, the sites provide our Navy an outdoor theater-level warfare laboratory.

These unique resources provide an immediate response to fleet needs and direct communication of fleet requirements to the Weapons Division technical community. In *Fleet Battle Experiment Bravo*, a Weapons Division rapid-targeting system aboard the Third Fleet's command ship was part of a land, sea and air network that tested 21<sup>st</sup> century warfighting concepts and capabilities. This exercise marked the first time actual imagery of a target located in a remote site was transmitted to the command ship at sea and then directly into the cockpit of the strike aircraft. Likewise, the Weapons Division projected its laboratory capabilities to better serve the Fleet by opening the Rapid Targeting Cell at Naval Air Station Fallon, NV. The cell is used to train Navy and Air Force pilots in the latest real-time-information-in-the-cockpit technologies and techniques and serves as a test bed for new laboratory developments. A similar cell in Aviano, Italy, is being used by our forces deployed on the Bosnian peace-keeping mission.

## SYNERGY

The Weapons Division collocates research, development, test and evaluation (RDT&E) functions for quick-turnaround testing, more flexible scheduling and better crisis response. From an economic perspective, this arrangement maximizes resources through dual use of expensive facilities and "piggybacking" on range tests. In addition, the easy access to Test and Evaluation facilities allows testing to be event driven, rather than schedule driven. Base Realignment and Closure (BRAC) studies indicated that if the collocated Weapons Division RDT&E functions were separated, upwards of \$3.3 billion would be required to duplicate facilities.

The Weapons Division is also working more closely than ever with the Aircraft Division to provide a smoothly integrated organization for the RDT&E of weapons and

platforms. The Weapons Division is participating in such multi-service projects as the Joint Advanced Distributed Simulation Project and among its own sites, is incorporating multiple players and platforms, real and simulated, in exercises that reflect the movement toward a network-centric warfare capability.

Additionally, the Weapons Division is closely linked with DOD facilities throughout the Southwest enabling control of more than 20,000 square miles of land, nearly 200,000 miles of sea space and almost 300,000 square miles of restricted airspace. With distinct yet complementary missions, these facilities share resources for RDT&E, training and tactics development for air, land and sea warfare, as well as ballistic missile defense. The ranges of the Southwest provide operational realism through a vast array of terrain and geographical features adjacent to the sea and littoral environments of the Pacific Ocean.

The Weapons Division further increased its extensive interaction with industry by signing 18 new Cooperative Research and Development Agreements, bringing the 1997 total to 30.

## PRODUCTS AND SERVICES DELIVERED

- Supported 28 multiple weapons-firing exercises on the Sea Range
- Supported substantial sorties on air-to-ground land ranges
- Flew over 600 QF-4 flight hours supporting the Commander in Chief Pacific Fleet
- Demonstrated sensor-to-shooter Rapid Targeting System in fleet exercises and then deployed to Bosnia
- Installed Advanced Self-Protection Jammer in operational F/A-18s
- Supported AV-8B avionics troubleshooting in Aviano, Italy
- Produced \$11.2 million in cost avoidance and outright savings of \$1.9 million through Affordable Readiness initiatives
- Achieved substantial improvements for the F/A-18, F-14, AV-8B and EA-6B through fleet-released operational flight programs and systems
- Completed Joint Standoff Weapon Technical Evaluation

and Operational Evaluation, obtaining approval for low rate initial production and interim early deployment

- Completed Joint Direct Attack Munitions integrated system evaluation tests for the F-16 and B-2
- Provided sole fleet training support for baseline Standoff Land Attack Missile (SLAM) and developed

a new warhead for SLAM Expanded Response

- Completed successful initial firings of Rolling Airframe Missile for dual mode and autonomous infrared mode

- Successfully completed Operational Evaluation on AIM/RIM-7R Sparrow

- Successfully completed preliminary and critical design reviews on Evolved Sea Sparrow Missile

- Achieved first intercept and successful fusing of Standard Missile Block IVA against a surrogate theater-ballistic-missile-defense target, and demonstrated performance of the all-up deformable ordnance system

- Executed the C-130 Alt Air ballistic missile target launch-demonstration program

- Completed development of High-Speed Maneuvering Surface Target

- Developed and tested the landing system used for the Mars Pathfinder

## AWARDS AND ACCOMPLISHMENTS

- R&D Magazine's *R&D 100 Award* for most technologically significant products (given for the invention and commercialization of a continuous emissions monitor that provides real-time measurement of toxic metals emissions in incinerator stack gasses)
- Federal Laboratory Consortium Award for Excellence in Technology Transfer
- U.S. Department of Energy Federal Energy and Water Management Award
- Naval Air Systems Command Award for Achievement in Safety Ashore (non-industrial category)
- Naval Air Systems Command PEO(T) Team Achievement Award (Tactical Automated Mission Planning System 6.1 Integrated Product Team)
- Naval Air Systems Command Golden Anchor Award (large shore category)
- Software Engineering Institute Level 3 Maturity Rating (F/A-18 Software Team)

## PRODUCTS AND SERVICES AT A GLANCE

Aircraft Armament Systems/Equipment  
Aerial Targets and Simulators  
Target/Threat Simulator Development  
Missile & Subsystems R&D and In-Service Engineering  
Freefall Weapons R&D and In-Service Engineering  
Airborne Weapons T&E  
Air/Sea Range  
Weapons Modeling and Analysis  
Weapons Systems Integration  
Aircraft/Missile Survivability Testing  
Electronic Warfare Ranges, R&D and In-Service Engineering  
Combat and Combat Control Systems R&D

F/A-18 Hornet fires a Sidewinder Air-to-Air Missile (AMRAAM) over the Weapons Division Land Range

WEAPONS DIVISION

## SERVICES DELIVERED TO THE FLEET

Our three remaining centers of industrial and technical excellence were hard at work in 1997, leveraging their unique core capabilities on behalf of the operating forces. With Base Realignment and Closure (BRAC) behind us, this year represented a period for consolidating our gains and moving forward with a renewed focus on quality and our customers. As the following paragraphs illustrate, our Naval Aviation Depots (NADEPs) at Cherry Point, NC, Jacksonville, FL, and North Island, CA, remain unsurpassed in quality, flexibility and responsiveness to customer needs.

All told, our NADEPs completed rework and repair on 232 aircraft, 702 engines, and 111,649 components. We completed 39 aircraft and 366 engines through interservice activities, and 62 aircraft and 113 engines through commercial activities. Managed by our Naval Air Pacific Repair Activity (NAPRA), contractors in Japan, Korea, Singapore, and Italy, completed 26 aircraft and 2,206 components. Our total industrial production for fiscal year 1997 included 359 aircraft, 1,181 engines and 113,855 components.

## QUALITY INITIATIVES

NADEP Cherry Point's Naval Engine Airfoil Center became the first Department of Defense activity to receive an ISO 9002 quality system certification. Significant process improvements, without any increase in staff, have resulted in 86,588 parts processed during FY97 (four times the FY95 output) with a decrease in turn-around time from an average of 175 to 81 days. Savings to DOD increased from \$5.2 to \$27 million during the same period.

In addition to numerous production line process improvements, NADEP North Island's largest and most concerted effort has been the design and development of an Integrated Maintenance Concept (IMC) program for the F/A-18, E-2C, and S-3 aircraft. Using IMC, we design preventative maintenance programs tailored to address individual product needs. This is a major shift in maintenance policy from the lengthy and costly Standard Depot Level Maintenance program. IMC is a Reliability Centered Maintenance based, scheduled maintenance program with an increased level of field service inspection at the aircraft operational sites. Significant reductions in cost and out-of-service time are expected as a result of this program. In 1998, we will extend IMC to more of our product line and into our intermediate and organizational maintenance programs.

NADEP Jacksonville has focused on maximizing the potential of depot operations by reengineering its business practices. During FY97, several modernized business practices were implemented and successfully demonstrated. The Earned Value Management System (EVMS),

which uses project management techniques and tools to improve cost, schedule and technical performance of major programs, has been particularly successful. The F-14 Upgrade program has used and demonstrated to Navy and Army experts its compliance with all DOD criteria. Officially designated in April 1997, NADEP Jacksonville is the only DOD maintenance activity so recognized. Concurrent with EVMS, the following quality improvement programs were implemented in a total systems approach:

- Manufacturing Resource Planning is the adaptation of a commercial program that improves scheduling, shop floor control and inventory management methods for industrial activities.
- Baseline Advanced Industrial Management (BAIM) is a computer program that develops planning products which are able to adapt to change as the maintenance process matures. BAIM also improves the budget process by providing more accurate cost and performance tracking and estimates.
- Facilities and Equipment Maintenance is an automated program which improves utilization of depot equipment and tooling through improved tracking and maintenance of equipment.

## AWARDS AND ACCOMPLISHMENTS

NADEP Jacksonville completed a 14-month program to correct an F/A-18 F404-GE-400 engine bare firewall situation. Using innovative measures, corrections were completed on engines for 167 bare fire walls (with 15 spares) by the entire F404 Team including the NAVAIR Integrated Program Team and NAVICP. Efforts resulted in improved accuracy in the parts requirements and depot capacity determination processes. Extended material parts lives were quickly established and advanced release contracts were effected with reduced production and delivery schedules. An innovative parts life growth strategy was developed incorporating newly instituted Fleet Leader and Component Analytical Inspection Programs. In recognition of their efforts, the Assistant Secretary of the Navy for Research, Development and

Acquisition presented the F404 Team with the 1997 David Packard Award for Acquisition Excellence.

NADEP Jacksonville also completed the Royal Thailand Navy A-7 refurbishment program five months ahead of schedule and under budget. The Depot completed rework on 18 aircraft and 27 engines, in addition to all technical engineering, repair of support equipment and training, and setup of the ground support equipment in Thailand.

NADEP North Island received the California U.S. Senate Productivity Award in competition with large California-based commercial manufacturing companies. The award was based on the Malcolm Baldrige National Quality Award criteria. NADEP North Island is the first government activity ever to receive this award, achieving the highest rating earned by a first-time recipient.

NADEP North Island, for the fourth year in a row, completed the County of San Diego Air Pollution Control District's annual inspection with zero notices of violation. The Depot was cited as a model station, having "the best pollution abatement program in San Diego County." The Depot also received the San Diego Business Journal Team Excellence in Management Award, Chief of Naval Operations Environmental Award for recycling, and the Commander in Chief Pacific Fleet Environmental Cleanup Award.

In August, NADEP Cherry Point and the Marine Corps Air Station were recognized by the State of North Carolina for outstanding achievement in waste reduction through source reduction, reuse, recycling and resource recovery. During FY97, the Depot eliminated potential hazardous waste by 2,245,065 pounds through recycling.

The NADEP corporation's central repository for labor hour standards development and analysis, located at Cherry Point, was recognized as the DOD Work Center of Excellence for productivity improvement and workload management.

## PRODUCTS AND SERVICES AT A GLANCE

- North Island, CA
  - Aircraft: E-2, F/A-18, C-2, S-3
  - Engines: LM2500
  - Component Repair: Instruments, Communication/Navigation, Radar
  - Technologies: Composite Repair, Bearings, Calibration, Hydraulics, Common ATE
- Jacksonville, FL
  - Aircraft: P-3, F-14, EA-6B
  - Engines: J52, TF34, F404
  - Component Repair: Electro-Optics, ASW Systems, Racks/Launchers, Electronic Warfare, Air Refueling Stores
  - Technologies: EO/EW, Environmental
- Cherry Point, NC
  - Aircraft: AV-8B, H-53, H-46
  - Engines: T58, F402, T76, T64, T400, J79
  - Component Repair: Dynamic Components, Rotor Blades, Props, Pneumatics, Support Equipment
  - Technologies: Composite Repair, Vertical Flight, UAV/RPV



# NAVAL INVENTORY CONTROL POINT

## SERVICES DELIVERED TO THE FLEET

The Naval Inventory Control Point, Philadelphia (NAVICP) has continued to maintain a high level of fleet support while freeing-up funds traditionally allocated to spares support for investment in the recapitalization of naval forces.

Throughout 1997, the percentage of mission capable and fully mission capable aircraft on deployers remained above or near goal. The two primary historical measures of NAVICP's effectiveness, Supply Material Availability (SMA) and backorders, continued to trend in the right direction. SMA for repairable items experienced a strong and sustained improvement, reaching over 80 percent by the end of FY97, up 9 percent over FY96. At the same time, repairable backorders have reached an all time low. Automation and process improvements in repairables management, which include a 47 percent decrease in components awaiting reinduction for parts, led the way for the reductions.

NAVICP reduced material investment through effective inventory reduction methods and innovative acquisition programs. Aggressive retention, contingency policy refinements and program reviews resulted in a \$1.6 billion reduction in wholesale inventory.

- A comprehensive review of Foreign Military Sales A-6 reserves led to the disposal of \$400 million of unneeded parts.
- At the retail level, the expansion of proven programs such as Readiness Based Sparing and the introduction of bold new initiatives, such as the Consumable Aviation Consolidated Allowance List program and Premium Transportation, enabled NAVICP to continue reduction of planeside inventory levels by \$1.3 billion since 1991 while ensuring readiness.
- A prototype of the Premium Transportation program for selected P-3 items showed that by consolidating the local inventory of many sites at a single, private sector transportation hub, transportation time is significantly reduced with a resultant need for fewer overall on-site spares.

## RELIABILITY IMPROVEMENTS

NAVICP continued its focus on reliability improvements for the cost reduction of aviation support. Buy Our Spares Smart (BOSS III), Direct Vendor Delivery (DVD) and Long Term Contracting (LTC) are some of the programs fueling the reduction in NAVICP spares investment. Through the use of Logistics Engineering Change Proposals (LECPs), the BOSS III program identifies and invests in reliability improvements that will produce a return on investment of at least two to one within ten years. DVD contracts provide the lowest cost support solution through supplier guaranteed reliability and availability. LTCs reduce the price of parts and reduce cycle times.

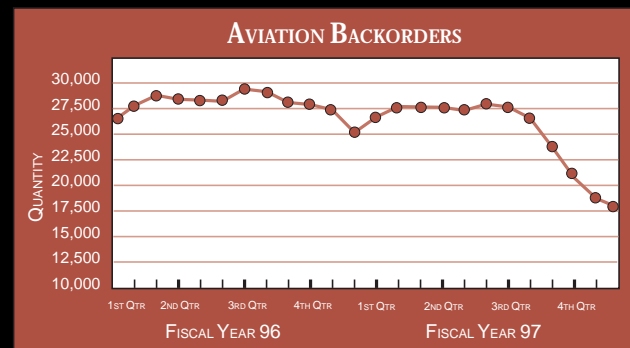


CH-46 delivers inventory to the USS George Washington (CVN73)

• The H-46 Attitude Heading Reference System gyroscope is an example of both reliability improvement and a shift to commercial support and is a TEAM IPT success story. Originated as a LEC, NAVICP awarded a DVD contract that provides a 25 fold projected reliability improvement and generates life cycle savings of \$48.4 million. Innovative features of this DVD contract include complete

commercial inventory management, 48 hour shipments, life cycle warranty, a reliability improvement guarantee and a reimbursable spares clause to ensure availability.

• In 1997, 30 percent of the dollar value of NAVICP contracts was awarded via LTCs, an all time high.



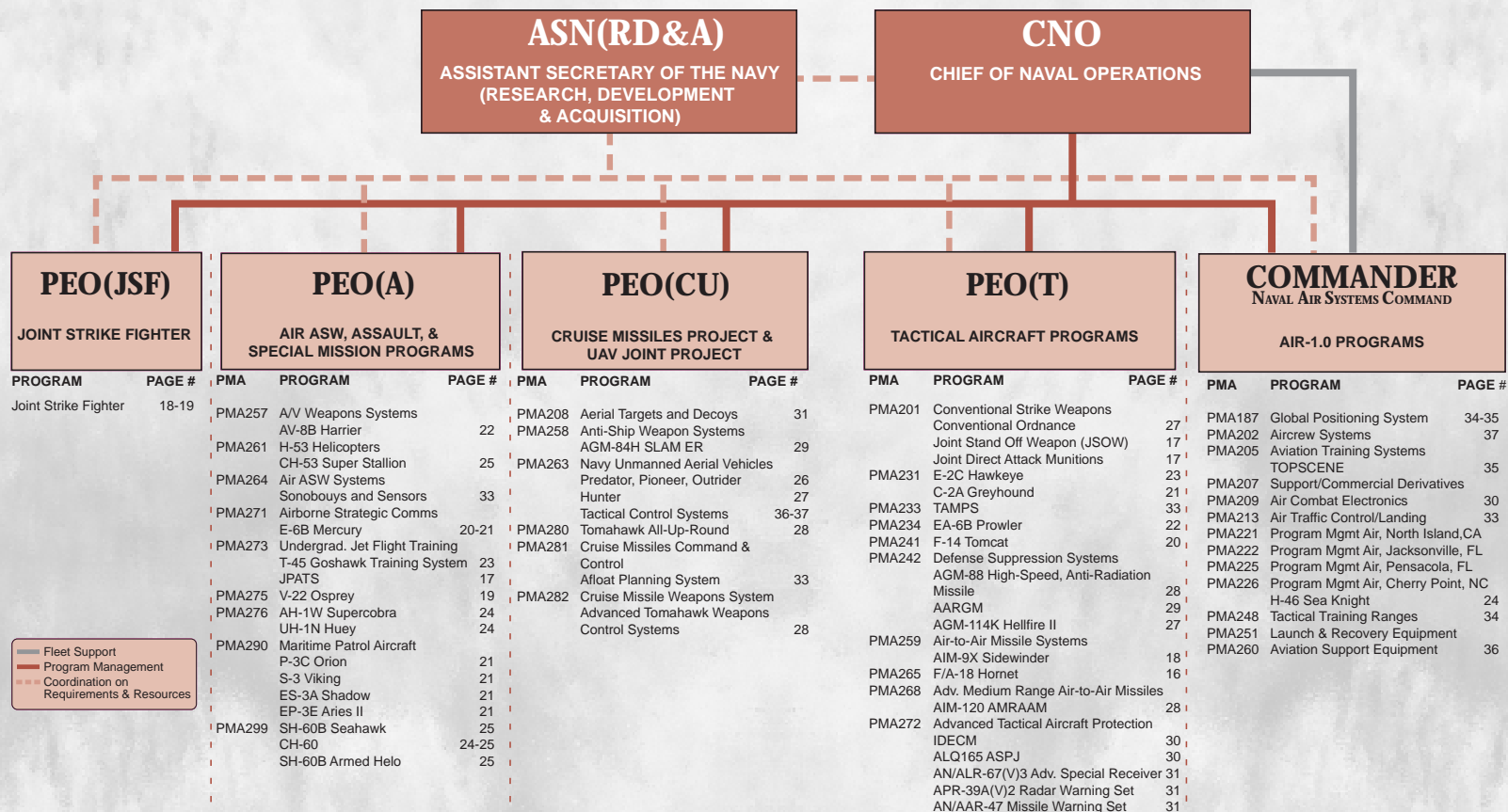
NAVAL INVENTORY CONTROL POINT

# ACQUISITION RELATIONSHIPS AND RESPONSIBILITIES

The TEAM's Program Executive Officers (PEOs) are responsible for all aspects of life cycle management for their assigned programs, providing direct oversight of cost, schedule and performance. PEOs report directly to the Chief of Naval Operations (CNO) for matters pertaining to in-service support and to the Assistant Secretary of the Navy for Research, Development and Acquisition (ASN(RD&A)) on acquisition matters.

NAVAIR's Commander has three primary roles: managing programs other than those assigned to the PEOs; providing for in-service support; and providing functional support, e.g., logistics, engineering, contracting, test and evaluation, etc., to assist the PEOs in program execution. As with the PEOs, the Commander reports to ASN(RD&A) for all research, development and acquisition issues and to the CNO on the support of operational forces.

Each program manager is given the authority, accountability and resources necessary to manage all aspects of his or her program from concept to disposal. Multi-disciplined Integrated Program Teams (IPTs) support TEAM program managers in accordance with program cost, schedule and performance guidelines. The IPT structure provides a responsive, single line of accountability and authority to the customer.



## RECAPITALIZATION

Work is well underway toward replacing existing fleet assets in critical mission areas. The F/A-18E/F *Hornet*, the V-22 and the Joint Strike Fighter (JSF) represent state-of-the-art technologies and performance enhancements, giving the Navy and Marine Corps the capacity to defeat the most sophisticated of enemies far into the next century.

### F/A-18 HORNET

In 1997, the F/A-18 program accomplished many new, innovative approaches to naval aviation acquisition. Nearly two years into the three-year flight test program at the Naval Air Warfare Center Aircraft Division Patuxent River, MD, development of the F/A-18E/F *Super Hornet* is on schedule, on budget, and the aircraft remains well under specified weight.

The F/A-18E/F flight test program has been extremely active with over 2,000 hours flown. During 1997 alone, the *Super Hornet* initiated and continued the following flight test activities: high angle-of-attack and spin tests; flutter, flying qualities and performance tests with external stores; mission systems, avionics and weapon delivery accuracy tests; aircraft systems evaluations (including propulsion and fuel); weapon separation testing; air-to-air missile tests (AIM-9 *Sidevinder*, AIM-7 *Sparrow*, AIM-120 Advanced Medium Range Air-to-Air Missile); electronic warfare expendables; fuel tanks (480-gallon external tanks and aerial refueling store); guided air-to-ground missile tests (*Harpoon*, Stand-off Land Attack Missile, GBU-10, High-speed Anti-Radiation Missile, and *Maverick*); and free fall air-to-ground bombs (Mk-76, BDU-48, Mk-82LD, Mk-82HD and Mk-84).

The Navy plans to procure a minimum of 548 *Super Hornets*. Twelve aircraft were funded in FY97; procurement numbers increase to 20 in FY98, 30 in FY99, 36 in FY00, 42 in FY01 and reach a final maximum rate of 48 per year in FY02. These numbers could vary depending on the progress of the Joint Strike Fighter Program. The F/A-18E/F is expected to attain initial operational capability in FY01.

The F/A-18 Production and Systems Development (P&SD) Integrated Program Team leads a wide spectrum of dynamic activities ranging from the annual F/A-18C/D new production to the life extension of the early F/A-18A/B. The Integrated Program Team is



F/A-18s and catapult team perform a first run 'no-run' on the catapult steam system aboard the USS George Washington (CVN73)

responsible for the heart and soul of all F/A-18s — systems development (hardware and software), new weapons and sensor integration (common to A/B, C/D and E/F), as well as in-service support for all systems that have reached stable operations.

On November 19, 1997, the Assistant Secretary of the Navy for Research, Development and Acquisition, John W. Douglass, approved the Advanced Tactical Forward Looking Infrared Radar (ATFLIR) program's Milestone II to enter engineering and manufacturing development. The decision came following a brief given by the ATFLIR government & industry team and months of preparation. The highlight of the brief was the team's use of innovative commercial business practices to solve funding shortfalls in FY98/99.

The Advanced Tactical Reconnaissance Systems (ATARS) Low Rate Initial Production II was approved by Mr. Douglass on December 9, 1997. With this approval, the Navy will procure six additional ATARS suites.

### JOINT STANDOFF WEAPON

In 1997, the highlight of the Joint Standoff Weapon (JSOW) program was the successful completion of operational evaluation for the AGM-154A and subsequent approval for Low Rate Initial Production. AGM-154A Operational Evaluation testing was completed in June 1997 with 21 out of 24 successful launches. Commander, Operational Test and Evaluation Force's final report found JSOW "operationally effective and operationally suitable" and recommended JSOW for fleet introduction. All Navy test objectives were met. Operational Evaluation was the perfect capstone to one of the most successful test programs in the history of the Navy and the Department of Defense. Operational Evaluation was completed with fewer weapons than allocated. These weapons, in turn, were deployed aboard USS *Nimitz* where they were carried extensively by the F/A-18s on patrol in the Persian Gulf. The AGM-154As performed flawlessly under operational conditions with neither shipboard contractor nor program office support. JSOW is ready for the Fleet, and the Fleet is ready for JSOW.

AGM-154A Live Fire Test and Evaluation was completed during this time frame. JSOW meets or exceeds the user-specified effectiveness requirements and will provide them with a lethal standoff capability well into the 21<sup>st</sup> century. Stellar results during Developmental Test and Evaluation were the key to a positive AGM-154A Low Rate Initial Production decision in January 1997. JSOW is lethal, affordable, in production and in the Fleet.

### JOINT DIRECT ATTACK MUNITIONS

Joint Direct Attack Munitions (JDAM), a Navy and Air Force program, will provide low cost inertial navigation/global position system guidance kits to be attached to 1,000 and 2,000 pound conventional bombs. The kits will enhance accuracy in adverse weather, from medium to high altitude, on a variety of aircraft. During 1997, accuracy results exceeded operational requirements in over 100 developmental drops from B-2, B-52, F-16 and F/A-18. Aircraft tests were conducted and approval for Low Rate Initial Production was received. Combined test phase Developmental Test-II/Operational Test-IIA was commenced on the F/A-18.

### JOINT PRIMARY AIRCRAFT TRAINING SYSTEM

The Joint Primary Aircraft Training System (JPATS) program was established to produce a replacement for the Navy's T-34C and the Air Force's T-37B training aircraft. JPATS is designed to be a common training system which includes the training aircraft T-6A *Texan II* built by Raytheon Aircraft Corporation, and associated academics and simulators. The thrust of the program has been to acquire a variant of an existing aircraft design and to apply maximum use of off-the-shelf components.

In 1997, the JPATS program completed its Critical Design Review. The first production T-6A aircraft is due for delivery to the Air Force in 1998. The Navy will begin production of its first of 339 planned aircraft in FY00.



### AIM-9X SIDEWINDER

The AIM-9X is a joint Navy and Air Force development program that will provide warfighters with the next generation "dogfight" air-to-air missile for the 21<sup>st</sup> century. The AIM-9X is designed to deploy on the F/A-18 C/D/E/F *Hornet*, and the Air Force F-15E *Eagle*, F-16 *Fighting Falcon* and F-22 *Raptor* aircraft, and will replace the AIM-9M *Sidewinder*. Capabilities will include full day and night capability, resistance to countermeasures, off-boresight acquisition, maneuverability and target acquisition superior to any AIM-9 predecessor. The AIM-9X will also be used in conjunction with the Joint Helmet Mounted Cueing System.

The government and Raytheon Missile Systems (formerly Hughes Missile Systems) are partners in an industry-led Integrated Process and Product Development Team, which will jointly complete all engineering and manufacturing development activities by January 2002. Developmental and operational testing schedules have been coordinated to reduce the developmental time needed to deliver missiles to the Fleet. The AIM-9X Program is a Cost as an Independent Variable (CAIV) Flagship Program charged with pioneering the way for other Navy programs to reduce the cost of quality weapon systems using innovative business procedures. The AIM-9X program is using CAIV principles to drive down the cost of the first production missile through an aggressive producibility program.

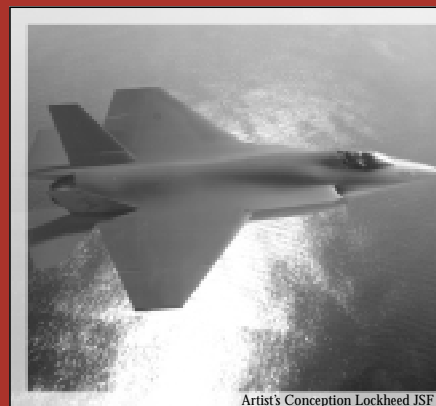
### JOINT STRIKE FIGHTER

The Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next-generation multi-role strike aircraft for the Navy, Air Force, Marine Corps and foreign allies. The carrier suitable variant of the JSF will provide the Navy with a multi-role, highly survivable strike fighter to complement the F/A-18E/F. The Short Takeoff and Vertical Landing (STOVL) variant will be a multi-role strike fighter to replace the AV-8B and F/A-18A/C/D for the Marine Corps and replace the *Sea Harrier* for the United Kingdom's Royal Navy. The Air Force variant will be a multi-role fighter, primary-air-to-ground, to replace the F-16 and A-10 and complement the F-22.

The cornerstone of the JSF Program is affordability — reducing the development cost, production cost and cost of ownership of the JSF family of aircraft. From the beginning, the program was structured to be a model of acquisition reform, emphasizing jointness, technology maturation and concept demonstrations, and early cost and performance trades integral to the weapon system requirements definition process. During FY97, JSF commenced a multi-year \$2.2 billion competitive concept demonstration effort and completed key initial design

AIM-9M *Sidewinder*

Artist's Conception Boeing JSF

V-22 *Osprey*

Artist's Conception Lockheed JSF

reviews with the program's prime contractors. Parallel efforts included continued requirements definition efforts and critical technology demonstrations to lower risk and life cycle cost. Denmark, Norway, and the Netherlands have joined the program; Canada has initiated action to join.

A model of Acquisition Reform, the JSF Program received the David Packard Award for Acquisition Excellence.

### V-22 OSPREY

A premier Marine aviation program and an essential element of NAVAIR's recapitalization program, the V-22 *Osprey* will provide the Marine Corps with improved amphibious/vertical assault capability. When compared to a helicopter, the V-22 is twice as fast, carries three times the payload, has five times the range and is self-deployable worldwide. It is a multi-service aircraft that will be used to satisfy the strike rescue needs of the Navy and the special operations needs of the U.S. Special Operations Command.

A versatile aircraft that can convert from helicopter to airplane mode, the V-22 is also a prime candidate for foreign military sales and civilian applications. State-of-the-art design and manufacturing tools such as Computer Aided Three Dimensional Interactive software, fiber placement, advanced technology assembly, integrated wiring system and lean production have resulted in reduced aircraft weight and cost. During 1997, three of four Engineering Manufacturing Development aircraft were delivered and are in flight test at Patuxent River, MD. Low Rate Initial Production Lots I and II are underway. Commercial procurement and support of the T406 engine is being implemented. Other aircraft components will be studied for potential commercial versus organic support.

The many aircraft and related systems we deliver on behalf of the Fleet require periodic modifications to keep pace with emerging operational requirements. These upgrades or improvements to current equipment are designed to maintain and enhance safety, capability and combat effectiveness. The following pages feature our leading modernization programs.

## F-14 TOMCAT

The F-14 is the Navy's premier long-range strike fighter aircraft. Technical and performance improvements are helping the *Tomcat* remain a viable threat in the Navy's aircraft arsenal. The F-14 Upgrade Program delivered 12 aircraft into service in 1997. The *Tomcat* is being outfitted with enhancements to prolong the aircraft life and increase time on station. Enhancements include: AN/ALR-67 Radar Warning Receiver, Global Positioning System, digital avionics, General Electric F110 turbofan engines for 30 percent added thrust, night vision capability, and structural and computer upgrades. A major safety enhancement to the F-14 will be the incorporation of a Digital Flight Control System designed to prevent departures from controlled flight. The *Tomcat's* next generation development of reconnaissance gives digital imaging and data link capability in 24 Tactical Air Reconnaissance Pod Systems to provide near real-time imagery for detection and identification of tactical targets, as well as immediate threat and bomb damage assessment.

The *Tomcat* was configured as a potent precision strike fighter with the incorporation of the Low Altitude Navigation and Targeting Infrared and Night targeting system. The *Tomcat* now has a deadly accurate autonomous designation and targeting capability for the delivery of laser guided bombs, including the GBU-24.

As a team effort with Naval Aviation Depot Jacksonville, the F-14 Team has experienced great success with Earned Value Management Systems to enhance their performance management and reporting systems.

## E-6B MERCURY

The Take-Charge-and-Move-Out (TACAMO) mission was developed to provide survivable, continuous, worldwide strategic communications between the National Command Authority and the U.S. Strategic Forces. To accomplish this mission, the aircraft systems must provide timely, accurate, and reliable receipt and transmission of Emergency Action Messages within the Strategic Connectivity System.

The EC-130G/Q *Hercules* aircraft was the first aircraft platform used to perform the TACAMO mission. It was replaced by the E-6A *Mercury* aircraft performing the mission with greater reliability, longer endurance, in-flight refueling capability, and capacity for future growth and enhancements. In 1993, the Secretary of Defense directed the transfer of the U.S. Strategic Command Airborne Command Post (ABNCP) mission

("Looking Glass") from the EC-135 aircraft to the E-6A. With the consolidation of the TACAMO/ABNCP functions, the Commander in Chief for U.S. Strategic Command will be able to execute direct command and control of strategic forces through the use of one rather than two airborne platforms. This system also serves as a backup to National Airborne Operations Center.

Sixteen E-6A aircraft are being modified to the E-6B by incorporating a mission crew compartment, Airborne Launch Control System for airborne Intercontinental Ballistic Missile programming and launch, Milstar EHF/UHF equipment, Global Positioning System, Mission Computer System, UHF C3 equipment, High Power Transmit Set, and a Digital Airborne Intercommunication and Switching System. Presently, of the sixteen E-6A aircraft being modified, Contractor Test/Development Test has been completed, four E-6B aircraft have been delivered to the Fleet, and the remainder are in production through 2001 by Raytheon Systems Company, Waco, TX.

## P-3C ORION

The P-3C *Orion* provides anti-surface warfare, command and communication, battle group support, littoral surveillance and aerial mining to the Fleet. The P-3C is no longer in production, but maintains its edge with a strong modernization program. In 1997, NAVAIR opened the P-3C Sustained Readiness Program production line and began an extensive modification program to combat shortened service life due to material degradation. This innovative approach is pre-emptively replacing airframe structural components to recapture existing fatigue life remaining, and will allow fleet commanders to continue relying on the *Orion's* first on-the-scene, flexible, multi-mission capability.

In 1997, NAVAIR also inducted the first aircraft into the Anti-Surface Warfare Improvement Program (AIP) modification line. AIP aircraft provide significant anti-submarine warfare and anti-surface command, control, communications and intelligence and Over the Horizon Targeting capabilities to the Fleet, and will complement the world class undersea warfare capabilities already fielded.

## S-3 VIKING

The *Viking* provides vital littoral surveillance, precision targeting and strike support to the Battle Group Commander, complementing its undersea and anti-surface warfare roles. During 1997, NAVAIR initiated the installations of Global Position Systems, an upgraded video recorder system (USH-42), the Communication Control Group and Critical Structures kits. Additionally, the new AYK-23 mission computer program entered production; the Critical Avionics Upgrade program

continued its final development; and a contract to demonstrate APS-137 B(V)5 Inverse Synthetic Aperture Radar/Synthetic Aperture Radar capability in *Viking* aircraft was awarded.

## ES-3A SHADOW

The ES-3A *Shadow*, a modification of the S-3 *Viking* airframe, meets critical organic electronic warfare requirements for the Battle Group by providing real-time tactical reporting of threat activity and intentions.

In 1997, the ES-3A completed Phase I of the Communications Improvement Program delivering Fleet Issue IV, which added the AN/ARC-187 radio and replaced the AN/USH-26 recorders. The first deployment of the Battle Group Passive Horizon Extension System, installed aboard the USS *John F. Kennedy*, was completed in October 1997. The ES-3A program also completed preparation for Critical Structures Upgrades which will begin installation in early 1998.

## EP-3E ARIES II

The EP-3E *Aries* provides vital enhancement of the Fleet's electronic warfare capability by reporting real-time threat activity and intentions beyond the Battle Group's horizon. In 1997, the final EP-3E *Aries I* was modified to the *Aries II* configuration, completing a Conversion in lieu of Procurement program. Procurements for the follow-on Sensor System Improvement Program (SSIP) were completed in 1997, and the first EP-3E *Aries II* SSIP was delivered for test. Also during 1997, NAVAIR executed the prototype installation of a Joint Signals Intelligence Architecture and new high band sensor capability.

## C-2A GREYHOUND

The C-2A *Greyhound* continues to provide essential Carrier On-Board Delivery (COD) of critical personnel and parts for the Navy's deployed Aircraft Carrier Battle Groups (CVBGs). Current plans require the C-2A perform its COD mission to support CVBG operational readiness through 2015. Sustaining worldwide *Greyhound* operations and readiness for the next 17 years is being made possible by a combination of fleet fatigue life management and an ongoing managed Service Life Extension Program which includes weapon system modifications. The *Greyhound* completed 17,500 equivalent flight hours of full scale fatigue testing. In 1997, the C-2A program completed 32 of 38 Global Positioning System installations. Along with the completion of the Carrier Aircraft Inertial Navigational System prototype and validation installation, development and validation testing were completed for the Flight Incident Recorder.

Aircraft Director guides F-14B *Tomcat* across the deck of the USS *George Washington* (CVN73)

### EA-6B PROWLER

The EA-6B *Prowler* continues to provide the Fleet with suppression and degradation of enemy air defense systems. To achieve maximum use of the TEAM's competency aligned organization and ensure availability of assets to meet fleet requirements, the Prowler Program Team was realigned into six Level I and 28 Level II Integrated Product Teams. The J52-P-408A engine integrated product team was established specifically to reduce operating and support costs and to explore opportunities for teaming with industry and the depot at Jacksonville.

The EA-6B Mission Planning Team formally joined the Joint Mission Planning Segment Team to provide EA-6B aircrews with a new Mission Planning System in FY02. The EA-6B Inventory Augmentation Group was chartered to provide recommendations on critical issues of aircraft inventory and the availability of operational aircraft. Accomplishments during 1997 included partial assumption of the Air Force's EF-111A mission, successful stand up of the fourth expeditionary squadron and delivery of one Expanded Mission Mobile Maintenance Facility to support forward deployed *Prowler* aircraft operating in Bosnia. The Block-89A Integrated Flight Test Program successfully completed first flight in June 1997. The Jammer Algorithm and Technique Optimization Team completed initial testing of jamming techniques specifically suited to the capabilities of the Universal Exciter Upgrade and the Band 9/10 Transmitter. The Band 9/10 Transmitter completed Operational Test and Evaluation and the production contract was awarded. Additionally, we have completed 75 percent of the installations of Accelerated Electronic Flight Instrumentation Systems.

### AV-8B HARRIER

The Marine Corps AV-8B *Harrier* Vertical Short Takeoff and Landing (VSTOL) aircraft offers an indispensable flexibility during amphibious and littoral operations. Work continued on the *Harrier II Plus* Joint Program to remanufacture earlier Day Attack AV-8B aircraft into the latest Night Attack version equipped with the APG-65 radar. This will enhance close air support in day, night and all-weather operations. This variant of the *Harrier*, carrying up to 13,200 pounds of air-to-surface and air-to-air ordnance, gives the Marine Corps and the Italian and Spanish Navies the capability they need to meet the demands of the early 21<sup>st</sup> century. During FY97, Boeing delivered three AV-8B remanufactured aircraft to the Marine Corps. The new *Harrier II Plus* aircraft was completed in 1997 for the Italian and Spanish Navies. Top program challenges include the Open System Common Avionics Requirement Program which will help to control the support costs of the computer systems in the *Harrier*.



EA-6B Prowler



AV-8B Harrier

### E-2C HAWKEYE

The *Hawkeye*'s airborne early warning systems far exceed ship-based radar in guarding against high speed aircraft and guided missiles. The first of 36 new reproduction aircraft was delivered to the Fleet in 1997. The Navy Mission Computer Upgrade, a leader in commercial off-the-shelf technology, successfully completed first flight testing and was approved to begin low rate initial production. In addition, the first E-2C entered into Phased Depot Maintenance (PDM) at NADEP North Island. PDM is a cost and time saving initiative designed to take the place of scheduled depot level maintenance.

Fleet evaluation of a second Parachute Safety Ensemble prototype was completed. All fleet inputs and requirements, including an auto-activation device, single point release, Universal Water Activation Release System, and an environmentally sealed chute, will be incorporated in the final design. A memorandum of understanding, a key element in future E-2C upgrades, was established with the Air Force for the use of a C-130 for development and testing of the Radar Modernization Program.



E-2C Hawkeye

### T-45 GOSHAWK

The T-45 *Goshawk* is the Navy's newest undergraduate jet trainer. The T-45 is part of the overall T-45TS Naval Undergraduate Training System composed of state-of-the-art flight simulators, academics material, training aids and equipment, a computer-based Training Integration System and a comprehensive Commercial Logistics Support Team. In December 1997, the delivery of the first T-45C digital cockpit aircraft (referred to as Cockpit-21) to Naval Air Station (NAS) Meridian, MS, marked the introduction and activation of NAS Meridian as the second T-45TS operating and training site (NAS Kingsville, TX, became the first T-45 operating site in 1996). Both NAS Kingsville and NAS Meridian will have approximately 90 aircraft serving naval aviation training needs. Capitalizing on Acquisition Reform initiatives pertaining to Electronic Data Interchange (EDI) uses, the T-45 program has developed and demonstrated EDI connectivity between all T-45 Integrated Product Team member sites. The "GOSNET" connects the Navy activities with Boeing, British Aerospace and Rolls Royce team members and allows for real time electronic data interchange that includes secure web-based access to aircraft drawings, technical publications, engineering data and aircraft flight status.



T-45 Goshawk



## AH-1W SUPERCOBRA AND UH-1N HUEY

The AH-1W *Supercobra* and UH-1N/HH-1N *Huey* continue their stellar performance for the Marine Corps. The *Supercobra*, operating from both ship and land, provides close air support, armed escort, fire support coordination and reconnaissance. Armed with a 20 millimeter cannon, a variety of air-to-surface and air-to-air guided missiles, rockets, gun pods, bombs and counter-measures, this versatile weapon system can take on both aircraft and armor. The *Huey*, operating from both ship and land, provides command and control support, search and rescue, assault support and medivac capabilities. The 4BW/4BN was established as a mid-life upgrade for both aircraft. The modification of the H-1 series aircraft will provide dramatic increases in maneuverability, speed and payload, while decreasing pilot workload and increasing situational awareness.

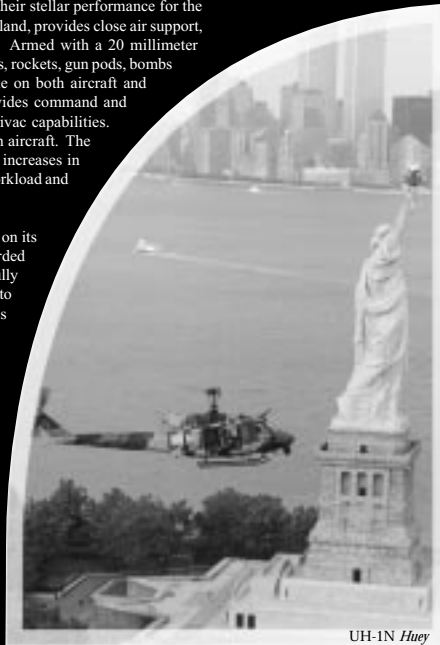
In 1997, the H-1 Upgrade Program completed key milestones on its way to Critical Design Review in 1998. A contract was awarded for the 4BN, and the Preliminary Design Review was successfully completed in June 1997. In August, a contract was awarded to Litton for development of a fully integrated cockpit and avionics suite. Until the 4BW/4BN aircraft arrive in the Fleet, the AH-1W and UH-1N/HH-1N will continue to support the Marine Corps. In 1997, NAVAIR delivered 11 AH-1Ws along with 51 Night Targeting Systems, 28 Cockpit Canopy Modifications and 30 Communication/Navigation Upgrades. Additionally, NAVAIR instituted safety improvement programs for two UH-1N/HH-1N issues, and the *Huey* completed 1997 without a single Class A or B mishap.

## H-46 SEA KNIGHT

The medium lift capacity H-46 continues to be a vital element of Navy and Marine Corps operations. The first Dynamic Component Upgrade (DCU) aircraft was produced in 1997. The DCU upgrade installs a new rotor head, upgraded transmission, improved flight and rotor controls and eliminates the current rotor head inspections. The first DCU upgrade was installed by Naval Aviation Depot Cherry Point and delivered to squadron HMM-162 in July 1997. The first state-of-the-art integrated Communication Navigation Control System (CNCS) modification was installed in the H-46 aircraft in FY97. The first CNCS field team installations were installed concurrent with installation of the ARC-210 radio, night vision goggles and heads up display. To reduce ground lateral vibration, a blade weighting scheme was developed. The development and production of the hardware was achieved in less than 12 months. The blade weighting scheme reduces aircraft vibrations and increases the reliability of the airframe and rotating subsystem components.

## CH-60

The CH-60 program is essentially a Navy modification to the Army's *Blackhawk* Helicopter. As such, the Navy will be entering into a joint venture with the Army by



UH-1N Huey



H-46 Sea Knight

## M O D E R N I Z A T I O N

initially using the Army's multi-year contract to procure CH-60s in FY99-01, followed by a Navy multi-year contract for the balance of the CH-60 procurement. The CH-60 mission is to maintain forward deployed fleet sustainability through airborne delivery of materials and personnel to support amphibious operations, and through search and rescue coverage. Subsequent to the Milestone II/Low Rate Initial Production decision, the program will enter into a nonrecurring engineering phase leading to the development and negotiation of the Navy's retrofit engineering change proposal for the Army multi-year contract.

## SH-60B SEAHAWK

In 1997, NAVAIR implemented a design change to the *Seahawk*'s mission processor (AYK-14 replacement). The design change bases the new mission processor on commercial off-the-shelf technology and allows for more cost effective methods for increasing the computer's capabilities in the future.

Also during 1997, the Navy officially recognized the cost benefits of the proposed Helicopter Master Plan and implemented strategies to put the plan into effect. These actions will result in fewer types and models of aircraft being operated by the Fleet, thereby saving costs overall. Notably, a very cost effective method of remanufacturing the *Seahawk* was chosen during 1997. The method will incorporate a newly built cabin section, in lieu of reworking the existing cabin sections. With service life extension program design changes incorporated, the new cabin sections will have a service life in excess of 20,000 hours.

## SH-60B ARMED HELO

The Armed Helo Team has enjoyed a successful year which culminated in the completion of the Armed Helicopter Rapid Deployment Kit (RDK) testing and the Forward Looking Infrared Radar Contingency Kit. Currently seven out of eight RDKs have been fielded to SH-60B *Seahawk* squadrons from Atsugi, Japan, to Mayport, FL, and are deployed all around the world as integral parts of the host ship's weapons suite. In addition, testing has already begun on the Combat Search and Rescue HH-60H Armed Helo Program for a planned initial operational capability of May 1998, with further testing for the fully integrated SH-60B Armed Helo "Core B" program starting in June 1998.

## CH-53E SUPER STALLION

A Marine Corps workhorse, the *Super Stallion* is indispensable to the Fleet's assault and heavy-lift capacity. We continue to improve the *Super Stallion*'s capability, increase safety and enhance survivability by incorporating a night vision system, heads up display, space-based global positioning system, the AN/APR-39 radar warning system and crew/troop crash worthy seats. During 1997, four new production CH-53Es were delivered to the Marine heavy lift community and the Marine Reserves completed their transition to the *Super Stallion* from the RH-53D aircraft.



SH-60B Seahawk



CH-53 Super Stallion

Unmanned Aerial Vehicles (UAVs) provide the Battle Field Commander with near real-time reconnaissance, surveillance, target acquisition and battle damage assessment by providing both day and night imagery to the control station and/or receiving station(s).

## PIONEER UAV

This year marked the *Pioneer's* 11th year of service with more than 16,000 total flight hours, 2,000 of which occurred during the last 12 months. The *Pioneer*, first deployed in December 1986 and operated extensively during the Gulf War, continues to serve the Navy with day/night surveillance, target acquisition and battlefield management. Recent support to the Fleet included land-based deployment to Bosnia and three amphibious transport ship deployments.

Successful land and sea-based flight testing of the UAV Common Automatic Recovery System and improved Shipboard Pioneer Air Vehicle Recovery System was conducted in 1997. Additionally, the first phase of the Modular Integrated Avionics Group flight testing and Pioneer Digital Map System development was completed.

## OUTRIDER UAV

The *Outrider* provides Army, Marine and Navy forces with dedicated day/night reconnaissance, surveillance, target acquisition and intelligence in the rapid cycle time required for success at the tactical level.

In 1997, *Outrider* successfully completed 27 flights and the ground control station integration and road/terrain mobility testing during which the data link was demonstrated to 200km. Notably, the heavy fuel engine requirement was deleted from the Advance Concept Technology Demonstration by the Under Secretary of Defense for Acquisition and Technology, and the UEL (UAV Engines Limited) gasoline engine was selected. Ground test and air vehicle integration of the gasoline engine was also completed and Autopilot/Autoland efforts have been initiated.

## PREDATOR UAV

The *Predator* was the first program to transition from an Advanced Concept Technology Demonstration (ACTD) to an Acquisition Category II production program under Secretary of the Air Force for Acquisition Milestone Decision Authority (August 1997). An Air Force program manager has been assigned to PEO(CU) since January 1997.

Initial de-icing tests began in April and final testing was completed in December. Also during 1997, the delivery of ACTD follow-on hardware commenced.

The *Predator* has continued to support Operation Joint Guard by flying out of Taszar, Hungary. Since March of 1996, the *Predator* has achieved 2,779 mission flight hours during 332 flights.



Outrider UAV

## HUNTER UAV

The *Hunter* UAV transmits reconnaissance, surveillance and target acquisition information in near real-time back to ground control and mission monitoring stations during combat operations. *Hunter* UAVs carry day/night video sensors, operate under limited adverse weather conditions more than 200 kilometers beyond the front lines with more than eight hours endurance, and land on unimproved runways.

During Task Force XXI at the National Training Center in March 1997, *Hunter* flew a total of 282 hours while simultaneously supporting the Division and Brigade. The *Hunter's* presence at this exercise forced the opposition to alter tactics to address UAV operations. Throughout the year, the *Hunter* UAV provided support to all Army, Navy, Marine and Air Force mission requests. The *Hunter* flew over 1,972 flight hours during FY97 and realized a significant decrease in its mishap rate.



F/A-18 and a variety of missiles and bombs



Hunter UAV

## CONVENTIONAL ORDNANCE

The role of iron bombs and unguided rockets remains indispensable to our airborne fleet. During 1997, NAVAIR delivered 4,200 laser guided training rounds and over 200,000 pyrotechnic cartridges and escape rocket motors. Also during 1997, enhancements to conventional ordnance continued with the completion of operational assessment of DSU-33 Proximity Fuse Laser Guided Bomb and the conversion of the Skipper Program Air Foil Groups to MXU-667 configuration. We received 851 MXU-651 LGB Air Foil Groups.

## AGM-114K HELLFIRE II

Launched by the Marines from their AH-1W *Supercobra* gunship, the AGM-114 projects precision striking power against tanks, structures, bunkers and helicopters. During 1997, 540 *Hellfire II* missiles were delivered to the Marines. Additionally, the Navy qualified the AGM-114B *Hellfire I* and the AGM-114K *Hellfire II* on the SH-60B aircraft and deployed *Hellfires* on guided missile destroyers supporting carrier battle groups in the Atlantic, Indian and Pacific Oceans, as well as in the Arabian Gulf and Mediterranean Sea.

## TOMAHAWK

The nation's premier long range cruise missile, the *Tomahawk*, can strike targets deep within enemy territory as demonstrated during strikes in Iraq and Bosnia. During 1997, 218 new Block III *Tomahawks* were delivered to the Fleet including the first deliveries with the Tomahawk Inflight Position Reporting System. The Tomahawk Base Line Improvement Program continued with development testing scheduled for 1998. Initial operating capability is planned for the year 2000.

Another project, the Advanced Tomahawk Weapons Control System (ATWCS), provides a phased upgrade approach to replace obsolete *Tomahawk* weapons control components with commercial off-the-shelf hardware and an open systems software architecture. The ATWCS will be installed on Aegis Cruisers and Destroyers, Spruance Class Destroyers and Los Angeles Class submarines. ATWCS was successfully installed at a United Kingdom land-based test site, to be used by United Kingdom submarines. Additionally, the Theater Mission Planning Center (TMPC) successfully completed developmental testing/operational testing for the TMPC Precision Strike Tomahawk.

## AIM-120 AMRAAM

The AIM-120C provides the Navy and the Air Force with beyond-visual range air-to-air missile capability. In FY97, NAVAIR delivered 106 AIM-120C tactical missiles to the Fleet. Also during 1997, the Pre-Planned Product Improvement Program released a software upgrade to the AIM-120C that increases the missile's resistance to electronic countermeasures. The AIM-120 Serviceable In-Service Time (maintenance cycle) was increased from 36 months to 60 months as a result of the excellent reliability of the missile. Approval to reprogram AIM-120B/C missiles aboard ship was received during 1997.

## AGM-88 HARM

The air-to-surface High-Speed Anti-Radiation Missile (HARM) is designed to home in on the transmissions of enemy radar systems and destroy them. Used by Navy, Air Force, and selected Foreign Military Sales (FMS) customers, the AGM-88 HARM is critical to suppression of enemy air defenses and the survivability of Navy strike aircraft. During 1997, a design was completed on a Single Aperture Antenna Switch that considerably boosts the reliability of the missile when used in the HARM's Sensor mode. Approximately 200 AGM-88B missiles were delivered to FMS customers, and all deliveries of the Navy AGM-88C missiles were completed. Additionally, preparations were made for the commencement of developmental testing in 1997 for the HARM Block 3A/5 software upgrade program, which will provide HARM with greater effectiveness and home-on-jam capability.



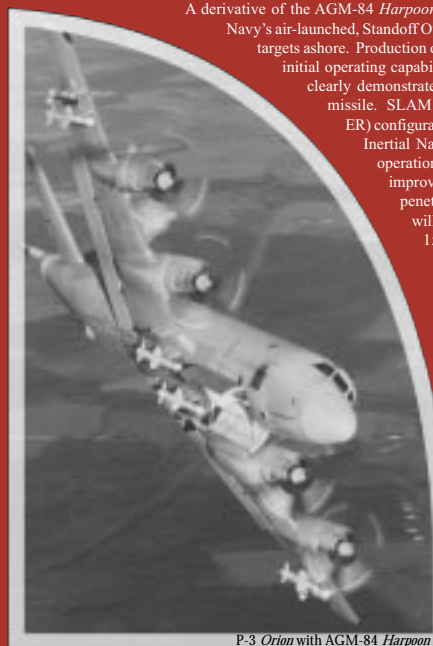
Tomahawk



AGM-88 HARM

## AGM-84H SLAM ER

A derivative of the AGM-84 *Harpoon* Missile, the Standoff Land Attack Missile (SLAM) is the Navy's air-launched, Standoff Outside of Area Defense weapon designed for fixed, high value targets ashore. Production of the last SLAM was completed in November of 1997. Since initial operating capability in 1991, fleet exercises and system improvements have clearly demonstrated that squadrons are improving their proficiency with the missile. SLAM is now being upgraded to the Expanded Response (SLAM ER) configuration with multi-channel integrated Global Positioning System/Inertial Navigation System, an upgraded mission computer with new operational flight software that incorporates man-in-the-loop interface improvements and automatic target acquisition, planar wings, and a penetrating, reactive-case titanium warhead. These improvements will allow controlled or autonomous precision strikes from outside 150 nautical miles of both land and ship targets with increased lethality and reduced operating costs. Successful free flight demonstration tests of SLAM ER occurred in 1997. SLAM ER is currently in Low Rate Initial Production.



P-3 Orion with AGM-84 Harpoon



AIM-120 AMRAAM

## AARGM ADVANCED ANTI-RADIATION GROUND MISSILE

The Advanced Anti-Radiation Ground Missile (AARGM) technology program is developing and evaluating next-generation guided missile technologies and capabilities for potential insertion into the High-Speed Anti-Radiation Missile or other weapons systems. The primary focus of the program is the design, development and demonstration of a multi-mode guidance system which can engage enemy air defenses even if these systems shut down radar radio frequency (RF) emissions or employ other anti-radiation missile countermeasures. This Small Business Innovative Research Phase III technology demonstration project incorporates advanced technologies including a highly sensitive, broadband passive Anti-Radiation Homing (ARH) seeker with a conformal antenna array, coupled with an active terminal millimeter-wave (MMW) seeker and global positioning system midcourse guidance. This approach allows for autonomous target detection, identification, and location of RF targets with the ARH/conformal array antenna subsystem, and subsequent fusion of ARH/MMW/GPS sensor data to provide for optimal terminal guidance. Alternatively, the seeker can function as a precision guided munition with stand-alone GPS midcourse guidance and a terminal seeker for non-RF soft targets.



## AIR COMBAT ELECTRONICS

Communication systems, navigation equipment, flight mission information systems, and aircraft avionics represent mission systems which are considered critical to the effective worldwide deployment of naval aircraft and weapons systems. Leveraging acquisition reform opportunities, 1,033 AN/ARC-210(V) radio systems were delivered in 1997, providing a 40 percent savings in unit cost, a 75 percent reduction in cost per flight hour, and a 520 percent increase in reliability. Many developmental activities proceeded, including the Embedded Global Positioning System/Inertial Navigation; Tactical Aircraft Moving Map Capability; Ground Proximity Warning System; Structural Data Recording Set; and the Crash Survivable Flight Incident Recorder System.

## INTEGRATED DEFENSIVE ELECTRONIC COUNTERMEASURES

The three subsystems of the Integrated Defensive Electronic Countermeasures (IDECM) system are Radio Frequency Countermeasures (RFCM), Common Missile Warning System (CMWS) and Advanced Strategic Tactical Expendable (ASTE).

The IDECM program received special recognition for excellence in acquisition innovation from the Assistant Secretary of the Navy, Research, Development and Acquisition in March 1997. Also during FY97, all three subsystems were in the Engineering, Manufacturing and Development phase and successfully completed their respective Critical Design Reviews (CDR). Throughout the year, NAVAIR was fully involved with both CMWS (Army lead) and ASTE (Air Force lead) in all phases of program planning and execution. Development of the hardware and software areas of the RFCM system (Navy lead) continued and considerable planning/coordination efforts were conducted on system test/integration with a variety of avionics systems on host aircraft (F/A-18E/F, AV-8B, B-1B). A RFCM Engineering and Manufacturing Development System Production Readiness Review and an ASTE CDR were successfully completed. Notably, the Air Force approved the RFCM system for use on B-1B aircraft in April 1997 and the first RFCM hardware (decoy mass models) was delivered in July 1997.

## ALQ-165 ASPJ

NAVAIR continued to respond to Operational Commander requests for the AN/ALQ-165 Airborne Self-Protect Jammer (ASPJ). ASPJ, available in limited numbers, provides capabilities not available from other current inventory countermeasure systems. The AN/ALQ-165 has been deployed in the F-14D *Tomcat* and to the extent possible in Lot 12 and up F/A-18C/D *Hornets*. The year ended with the order of an additional 36 systems from the joint venture which will permit more orderly equipment use of forward deploying units.



ES-3A Shadow

## M O D E R N I Z A T I O N

### APR-39A(V)2 RADAR WARNING RECEIVER

During 1997, the APR-39A(V)2 Radar Warning Receiver program lead transitioned from the Army to the Navy under PEO(T) leadership. Management of this critical radar warning receiver is conducted via a joint service technical team and will eventually field over 800 systems for all naval assault support aircraft, providing the cornerstone of the self-protection suite for aircraft well into the 21<sup>st</sup> century. Integration and engineering efforts on the HH-60H, AH-1W, UH-1N and MV-22 aircraft continued in support of this system.

### AN/ALR-67(V)3 ADVANCED SPECIAL RECEIVER

After a successful Operational Test Readiness Review, the AN/ALR-67(V)3 Advanced Special Receiver entered an operational assessment test period on the F/A-18C/D. The system was then successfully tested on a F/A-18E/F in the Air Combat Environment Test and Evaluation Facility. The AN/ALR-67(V)3 has already entered technical evaluation, due to be completed early in 1998.

### AN/AAR-47 MISSILE WARNING SET

The AN/AAR-47 Missile Warning Set (MWS), utilized to warn aircrewmembers against surface-to-air and air-to-air missiles, detects missiles and provides cockpit audio/visual warning messages via the control indicator or the AN/AAR-39 family Radar Signal Detecting Set. At the appropriate time, the MWS initiates countermeasures by sending a command signal to the AN/ALE-39/47 Countermeasures Dispenser without need for aircrew intervention.

During 1997, NAVAIR exercised contract options for 500 systems and accepted delivery of over 200 systems. Additionally, a third production contract for the AN/AAR-47 MWS was awarded in September 1997 via full and open competition. NAVAIR also awarded the Microprocessor Upgrade Contract. A hardware preliminary design review (PDR) was held in March 1997, with a software PDR held in June 1997. Subsequently, the combined hardware and software critical design review was held in July 1997 in preparation for entering test in October 1997.

### AERIAL TARGETS AND DECOYS

Aerial targets and decoys are procured for fleet training exercises wherein weapons systems developers simulate threat systems. NAVAIR completed test programs for the VANDAL EER, Extended Range BQM-74E, AQM-37D upgrade, and the MA-31 foreign comparative test. Target capabilities range from subsonic to supersonic speeds and low to high altitude flights. During 1997, we awarded contracts for 307 aerial targets. Decoys divert the attention of hostile defenses away from strike aircraft by saturating hostile radar-controlled air defenses.



EP-3E Aries



Aerial Target

## SCIENCE AND TECHNOLOGY

The corporate direction and oversight of the development of science and technology for naval aviation is accomplished by the Naval Aviation Office of Science and Technology (NAVSTO), AIR-4.0T. This office is chartered jointly by the Office of Naval Research (ONR) and the TEAM. The NAVSTO focuses development of new technology on the priorities of the naval aviation acquisition community through close coordination with ONR, OPNAV (N-88 and N-091) and the Fleet. The NAVSTO also serves as the focal point and interface with the other services and agencies, the Office of the Secretary of Defense and the private sector on naval aviation science and technology matters. Following is a listing of representative programs undertaken by NAVSTO during 1997. The programs address the unique nature of Navy and Marine aviation and the extreme environment in which our systems operate.

- Demonstrated, through a joint program with the Army and Air Force, jet engine component technology advances which will result in a 23 percent reduction in fuel consumption for patrol, transport and rotary wing applications
- Developed a signal processing technique which reduces noise and increases system sensitivity, providing longer detection ranges for airborne radar warning receivers
- Developed and demonstrated a tactical information visualization tool for in-cockpit display, "Powerscene", which generates real-time 3-D perspective scenes and couples these with a 2-D moving map
- Developed, demonstrated and transitioned a new concept for field repair of composite structures
- Transitioned a multiple wavelength day/night-usable laser protective visor to Navy Aircrew Systems and Army Aircrew Integrated Systems
- Developed and tested a novel method of stabilizing missile seeker platforms using a simple mirror assembly controlled by servo motors, a device designed to increase line-of-sight pointing responsiveness, and reduce logistics support acquisition costs by 30 percent
- Demonstrated progress in the development of a fiber optic gyro on a chip — technology expected to increase accuracy of inertial measurement units for missiles by ten, while reducing costs by half

• Using the Small Business Innovation Research Program, tasked over 100 small businesses to conduct feasibility studies, prototype development, and test and evaluation, resulting in safer, more affordable products for the Fleet, as well as for commercial applications

## AFLOAT PLANNING SYSTEM

NAVAIR successfully deployed the Afloat Planning System on four Carrier Battle Groups, with over 200 *Tomahawk* Missions planned by forward deployed Battle Group Commanders. The Joint Service Imagery Processing System - Navy was deployed on five Carrier Battle Groups and provided unprecedented imagery products and imagery-derived intelligence reports to the warfighters in support of targeting and C4I. The focused logistics support provided to *Tomahawk* mission planners received numerous accolades from the Fleet, and was the Navy's nominee for the Packard Award.

## SONOBUOYS AND SENSORS

Since World War II, development of the air-launched sonobuoy and a variety of sensors have been among our leading priorities. Air Anti-Submarine Warfare (ASW) sonobuoys include three basic types: passive sonobuoys which detect noises from submarines; active sonobuoys which detect acoustic pulses bounced off submarine hulls; and special purpose sonobuoys which measure the ocean water temperature profile or communicate with submarines. As the nature of anti-submarine warfare continues to change, it remains our responsibility to ensure that the Fleet has the sonobuoys and sensors necessary to meet any potential threat. During 1997, we continued the development of improved equipment and delivered 59,149 sonobuoys for operational use.

The Generic Acoustic Stimulator System (GASS) Research and Development program will provide the highest quality in acoustic fidelity and environmental realism for acoustic ASW simulations — especially for littoral and shallow water ASW training scenarios. GASS uses an extensive database of acoustic signatures approved by the Office of Naval Intelligence, environmental modeling validated by the Oceanographer of the Navy and the characteristics/specifications of the various ASW sensors. Using GASS, ASW aircrews can train for any spot in the world, against any possible target, using whatever sensor they choose.

The GASS program, exportable to each Air ASW Weapon System Trainer (WST), minimizes the cost of developing software for individual WSTs and ensures standardized training throughout the Fleet. The GASS Engineering and Manufacturing Development contract was awarded in February 1997.

## TACTICAL AUTOMATED MISSION PLANNING SYSTEM

The Tactical Automated Mission Planning System (TAMPS) provides 100 sites, including 11 aircraft carriers, with interactive mission plans and vital weapons systems data sources. The digital capability enables warfighters to optimize mission, survivability and accomplishments.

In 1997, data access and planning flexibility were significantly increased with the delivery of TAMPS 6.1 to carrier air wings and Marine expeditionary forces. The team provided the Fleet with significant hardware upgrades, moving from aging DTC-2 and ACE-VME computers to the SUN Ultra product line. Sixty-five new planning systems were procured for delivery to the Fleet. Future plans include the delivery of the Navy-Portable Flight Planning System, the Tactical Strike Coordination Manager and TAMPS 6.2 with the development of the Joint Mission Planning Segment (JMPS). Planned as a Navy and Air Force co-development effort, this will incorporate concepts from Joint Vision 2010 and Information Technology for the 21<sup>st</sup> century.

## AIR TRAFFIC CONTROL

Air Traffic Control and Landing Systems program office continued to upgrade the precision approach and air traffic control services for fleet operations. These systems support control and landing applications at sea, as well as at Navy and Marine Corps air stations worldwide. Marine air traffic control and landing systems support Marine Corps expeditionary requirements. A new Fleet Area Control and Surveillance Facility was established as part of the Joint Control Facility at NAS Pensacola. The Caribbean Regional Operational Control Facility was also completed and has transitioned to the U.S. Southern Command. Deliveries of the Integrated Voice Communications Switching System were commenced with installations planned for 13 air stations.

Electronic Warfare disks located at Chesapeake Test Range, part of the Atlantic Test Ranges and Facilities

SUPPORTING SYSTEMS

## TACTICAL TRAINING RANGES

The Tactical Aircrew Combat Training System (TACTS) is a ground-based tracking/simulation system installed at four sites. Enhancements achieved during 1997 at these sites include:

- Fallon, NV - doubled tracking miles to 20,000 square miles
- Cherry Point, NC - expanded to track over Camp LeJeune
- Beaufort, NC - new 10KW wind generators
- Yuma, AZ - low level tracking improvement

The Large Area Training Range (LATR), a GPS based cooperative tracking system, is currently at three training sites: Southern California Offshore Range (SCORE), Virginia Capes Littoral Warfare Training Complex, and Pacific Missile Training Facility. These ranges received upgraded software to perform simultaneous exercise data collection and debrief.

The next generation TACTS/LATR, the Joint Tactical Combat Training System (JTCTS) is in development for mobile capability. JTCTS was successful in 1997 with hardware and software critical design reviews and demonstrations of Prototype Display/Debrief software and Data Link Transceiver software via factory test followed by field test. The JTCTS data link transceiver also demonstrated successful operation in its various modes over its frequency range. The automated bomb Weapons Impact Scoring System has been installed at Townsend Air National Guard, GA; Pachino, Italy; and Superior Valley, CA. Five Electronic Warfare (EW) Training Range Simulators, representative of various threat radars, were installed this year. An EW Response Monitor was installed at the SCORE range.

## GLOBAL POSITIONING SYSTEM

The Fleet has greatly benefitted from the installations of global positioning systems (GPS) into their aircraft. GPS provides a tremendous increase in world-wide navigational and tactical accuracy, enhanced probability of kill for the warfighter, quicker acquisition and tracking tactics for ASW and mine warfare missions, and improved world-wide combat search and rescue (CSAR) performances. GPS also provides the precision timing required for all command and control evolutions. Furthermore, GPS replaces out-dated navigational equipment and provides a significant increase in overall user equipment reliability. Ultimately, the introduction and installation of GPS into the Fleet reduces the warfighter's mission planning time, improves tactical accuracy and provides the bridge to future navigational requirements.

During 1997, NAVAIR delivered 375 fully integrated GPS installations in Navy/Marine Corps and Coast Guard aircraft and 684 interim portable GPS receivers for use in Navy passenger carrying aircraft.



Large Area Training Range (LATR) Pod



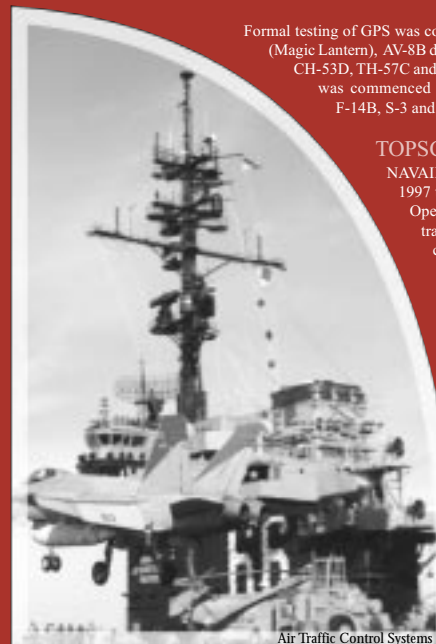
Global Positioning System

Formal testing of GPS was completed in the following aircraft: AH-1W, HH-1N, SH-2G (Magic Lantern), AV-8B day attack, AV-8B radar, TAV-8B, C-9B, DC-9, C-20G, T-45A, CH-53D, TH-57C and VH-60N. Formal testing of GPS integration and installation was commenced in the following aircraft: AH-1W, HH-1N, C-9B, DC-9, F-14B, S-3 and the TH-57C.

## TOPSCENE

NAVAIR delivered eight TOPSCENE Mission Rehearsal Systems in 1997 to the Navy/Marine Corps team and the Army 160th Special Operations team. TOPSCENE is the prewar mission rehearsal training that aircrews receive prior to operational deployment/combat. The system consists of source data/imager, a data base production facility at NAS Fallon, NV, which builds 3-D scenes and cultural features, and a deployable playback unit that provides 3-D scenes for mission rehearsal.

TOPSCENE was validated in the Persian Gulf in 1990 and has since been in use by operational forces in Haiti, Libya, Bosnia, Korea and Albania. The most important feature, determined by aircrew feedback, is that TOPSCENE gives aircrews increased confidence to successfully conduct their missions, significantly improving their target acquisition capability — essential elements in giving aircrews the “combat edge.”



Air Traffic Control Systems



TOPSCENE



## SUPPORT EQUIPMENT

The Consolidated Automated Support System (CASS) provides the Fleet with the capacity to test electronic equipment both ashore and aboard ship. During FY97, NAVAIR purchased 60 CASS stations and installed 39 CASS stations into 6 fleet units. NAVAIR also took delivery of the first Electro-Optics (EO+) Low Rate Initial Production from Lockheed/Northrop Grumman and installed it aboard the USS *Lincoln* for Operational Evaluation.

Additionally, a contract was awarded to Boeing and Lockheed Martin to "off-load" support of the F/A-18 Nighthawk Forward Looking Infrared Radar pod from the Electro Optics Test Set to CASS EO+. During 1997, NAVAIR delivered 1,864 articles of common support equipment to the Fleet, including 535 items of pollution prevention equipment.

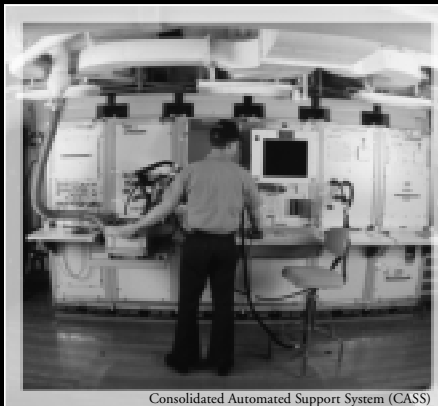
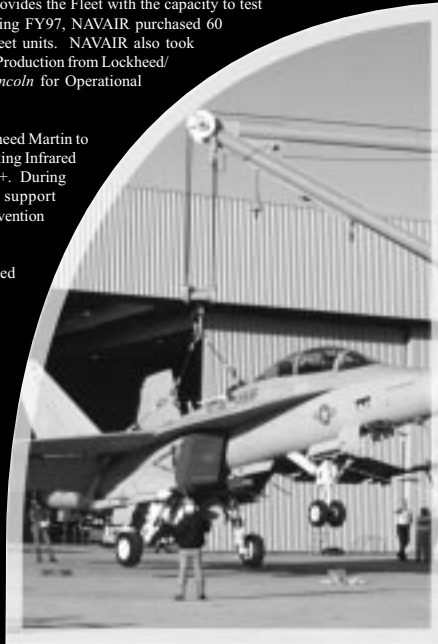
Highlights of common Support Equipment are provided below:

70 A/S 32A-32A Shipboard Tow Tractors  
16 A/M 32K-42A Trailers  
31 Linkless Ammunition Loader System Loaders  
36 Linkless Ammunition Loader System Replenishers  
200 MHU-202 Trailers  
241 Ultrasonic NDI units

## TACTICAL CONTROL SYSTEMS

The Tactical Control System (TCS) provides warfighters with a common, interoperable tactical UAV Ground Control Station to support reconnaissance, surveillance and combat assessment. Specifically, the TCS provides users with five levels of scalable UAV interaction that include passive receipt and dissemination of imagery/data to over 20 service C4I systems, air vehicle and payload control, and UAV launch and recovery. TCS will be used to plan tactical UAV missions and to control the *Predator* Medium Altitude Endurance UAV, the *Outrider* Tactical UAV, the *Pioneer* UAV and all future tactical UAVs. In addition, plans to integrate TCS with the *Pioneer* and *Hunter* UAVs are also being drafted. TCS has an objective requirement to receive and disseminate payload information from the *Global Hawk* and *Dark Star* High Altitude Endurance UAVs. The ability to interface with other manned and unmanned reconnaissance platforms and intelligence systems provides information superiority through cross-cueing.

TCS is being designed to stringent architectural standards to satisfy tactical UAV operational requirements that maximize use of commercial off-the-shelf and government off-the-shelf hardware and software whenever possible. The TCS design will



Consolidated Automated Support System (CASS)

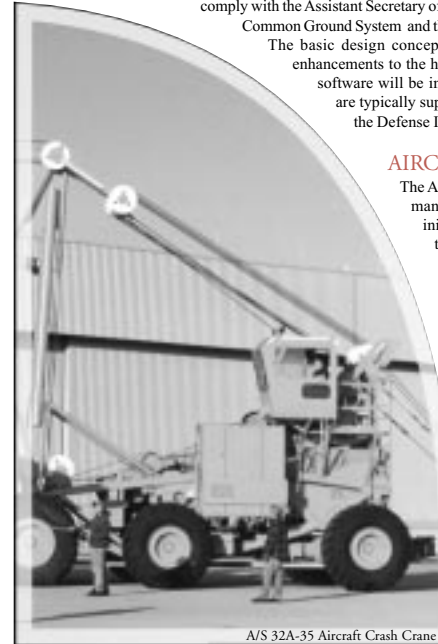
comply with the Assistant Secretary of Defense for C3I Joint Technical Architecture, the Distributed Common Ground System and the standards of the Common Imagery Ground/Surface System. The basic design concept offers an open architecture so future technologies and enhancements to the hardware and software can be easily incorporated. The TCS software will be interoperable and capable of being hosted on computers that are typically supported by each service (TAC, Sun, SGI) and compliant with the Defense Information Infrastructure/Common Operating Environment.

## AIRCREW SYSTEMS

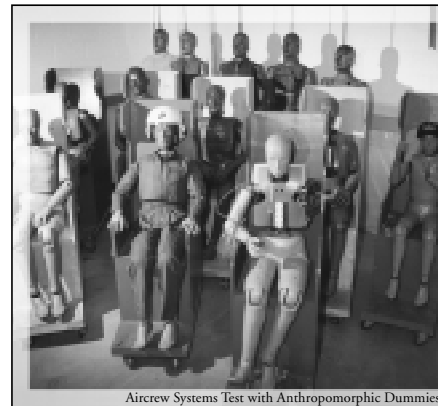
The Aircrew Systems program office provides life cycle acquisition management for Aviation Life Support Systems. Acquisition initiatives include the use of nondevelopment items; joint and tri-service developments; and NATO-allied cooperative ventures, which expedite introduction into Navy and Marine Corps fixed and rotary wing aircraft, reducing costs and promoting commonality. During 1997, Aircrew Systems was given authorization to award the first production option for a Chemical, Biological and Radiological protection unit, and a contract to incorporate a harness mounted airbag system into the AH-1W *Supercobra* Aircraft. Aircrew Systems also successfully completed environmental and saturation testing for the Laser Eye Protection Improvement Program. Among other equipment, we delivered 6,465 helicopter emergency egress devices, 1,344 flotation collars, 393 helicopter backpack life rafts, 145 quick donning suit leak test fixtures, 85 four man and 57 twelve man survival assemblies, and 53 navy aircrew ejection seats.

Test and development accomplishments include:

- Prototype integration testing of crashworthy troop seats in H-53D aircraft
- Thin pack parachute qualification testing for E-2 and P-3 aircraft
- Sample delivery of first proof of concept for the Joint Service Advanced Laser Eye Protection Visor Program
- Enhanced Passive Noise Reduction readied for competitive procurement



A/S 32A-35 Aircraft Crash Crane



Aircrew Systems Test with Anthropomorphic Dummies

# REDUCING COST

Our Navy is operating in an era of shrinking resources, with a mission that remains unchanged. It is the TEAM's responsibility to keep our operating fighting forces viable in spite of funding constraints. We must continue to support readiness, modernize aging aircraft and equipment, and reconstitute the Fleet with advanced technologies designed to meet the demands of the future. Consequently, the processes we use to deliver products and services must be as streamlined and efficient as possible. We are determined to manage our organization with world-class business efficiency and get the most out of every dollar we spend.

Since the beginning of the decade, we have reduced our work force by over 24,000 people (42 percent) and are headed toward a total reduction of approximately 27,000 (46 percent) by 2003. This includes a 38 percent reduction in civilian headquarters personnel. We have closed three of six naval aviation depots and will have closed four of nine product centers by the end of the decade. Today, our NADEPs are operating at 95 percent capacity on a single-shift basis. These closings have produced significant savings in overhead. Within the depots, the overhead costs for 1997 were about \$340 million less than they were in 1991, down almost 40 percent. The product centers produced similar savings of about \$300 million. By the end of the decade, we will realize over \$1 billion in annual cost savings as a result of these manpower reductions.

We have sized to fit our minimum essential capabilities given the mission we have to perform and will seek out the most effective and affordable support arrangements as we move forward. Our focus now is on changing the way the work gets done. In the future, we will continue to pursue savings in the areas of outsourcing, total life cycle cost reduction, acquisition reform and large-scale process improvements.

In 1997, the Chief of Naval Operations asked us to identify areas with potential for outsourcing. Outsourcing enables us to capitalize on private sector capabilities, while retaining responsibilities that are core to our mission, or that we can perform more efficiently in-house. Over the next five years, the Navy plans to study about 80,000 positions Navy-wide (70,000 civilian and 10,000 military). Savings of about \$1.4 billion are expected and have already been programmed into the budget cycle. This year 11,000 positions were studied across our Navy, including 1,346 within our TEAM (located in our Test and Evaluation and Shore Station Management functions at China Lake and Point Mugu, CA, Patuxent River, MD, and Lakehurst, NJ). We are conducting these studies with the utmost scrutiny and fairness to ensure the best outcome for our Navy. If decisions are made to outsource portions of our work, we will support that outcome and do our best to provide a smooth transition with minimum impact on our fleet customers.

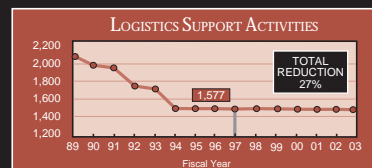
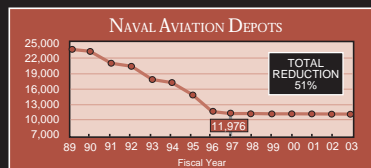
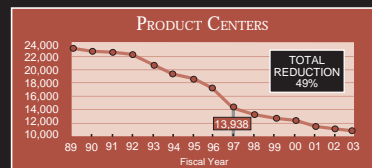
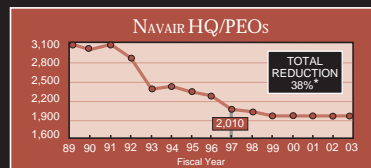
In 1997, about 80 percent of the dollars we managed was under contract with private industry. Under the umbrella of Acquisition Reform, we continue to solicit ideas from industry on simplifying the acquisition process and reducing their operating costs, which will ultimately drive down the cost of procuring and sustaining new systems and equipment. Ultimately, our intent is to employ the best value mix of participants (SYSCOM, fleet and industry) aimed at providing new technologies, state-of-the-art products and full life-cycle support to our operating forces. Several of our most promising initiatives are discussed under the Acquisition Reform Initiatives section.

Operations and Support is another prime candidate for reducing cost, as it represents the largest piece of our naval aviation budget. We are working with fleet leadership to gain an understanding of what drives every element of cost, which will give us insight into the areas requiring significant improvement. Through application of valuable in-service experience, we are developing innovative maintenance concepts tailored to individual product needs. Our goal is to support readiness and reduce the cost and time it takes to bring products to the Fleet.

In the final weeks of 1997, we embarked on an intensive, command-wide process improvement effort aimed at reducing costs and shortening cycle times. This effort will stretch across all business lines, including acquisition management, test and evaluation, repair and modification, in-service engineering, and research and development. Through activity based costing, we will examine our major processes and their cost drivers, with a clear intent to identify and reduce non value-added work. We will integrate and prioritize our process improvement efforts at multiple levels within our organization and in our work with the Fleet and industry. This analysis will enable us to target processes with the greatest potential payback for our customers.

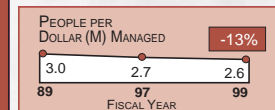
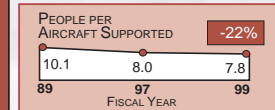
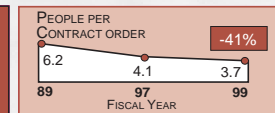
As we adjust to reductions in people and infrastructure in our part of naval aviation, we are moving forward with our eyes trained on one clear target - sustaining maximum readiness and capability for the Fleet through the effective utilization of available resources. We have demonstrated positive results and look forward to new opportunities working with industry and the Fleet to reduce acquisition costs across the board.

## CIVILIAN TOTAL REDUCTION 48% FROM FY89 - FY03

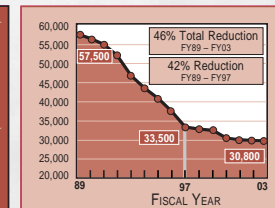


CIVILIAN: FY89-96 ARE CERTIFIED E/S; FY97-03 ARE FY98/99 PRESIDENT'S BUDGET, LOGISTICS SUPPORT ACTIVITIES, NADEPS AND HQ NORMALIZED TO PRE BRAC ORGANIZATION ALIGNMENTS (PMA)(F) 225/227, NATSF DET, NAMO, NADOC)

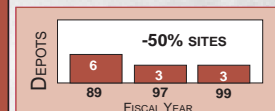
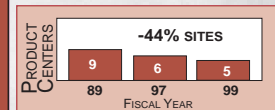
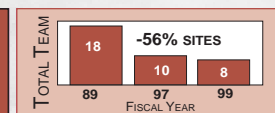
## REDUCING COST



## NAVAL AVIATION SYSTEMS TEAM FY06 PEOPLE (MILITARY/CIVILIAN)



## TOTAL TEAM SITES, PRODUCT CENTERS, AND NAVAL AVIATION DEPOTS



# REDUCING COST

## BASE REALIGNMENT AND CLOSURE

The Navy has been aggressive in reducing infrastructure in recent years and rightfully so. That is where the savings could be achieved most rapidly. Through Base Realignment and Closure (BRAC), the Naval Aviation Systems Team has consolidated functions, closed facilities, transitioned workload and reduced personnel – producing significant direct and overhead savings which will be passed on to our customers.

Since the late 1980s, we have gone from an organization of over 57,500 military and civilian employees at 18 sites, to just over 33,500 people at 10 sites, and are moving toward a total reduction of about 27,000 (46 percent) by 2003. Three of six naval aviation depots have closed; and four of nine product centers with have closed by the year 2000. In 1998, remaining BRAC actions will involve relocating propulsion functions from our product center at Trenton, NJ, to Naval Air Station Patuxent River, MD, and Arnold Engineering Development Center in Tullahoma, TN. In addition, we will move our two logistics support activities (the Naval Aviation Engineering Service Unit and the Naval Air Technical Services Facility) from Philadelphia, PA, to Naval Aviation Depot North Island, CA.

This year was particularly significant for our TEAM as we moved our entire headquarters operation people (nearly 3,000) from Crystal City, VA, to Patuxent River, MD. This move represents a full-scale consolidation of major life-cycle acquisition programs with Patuxent River's immense research, development, testing and evaluation mission. Today, Patuxent River stands as a full-spectrum fleet support powerhouse for our Navy's aircraft and related systems. Our customers will be the primary benefactors of increased synergy among acquisition functions.

Once the Trenton and Philadelphia moves are behind us, we will have completed one of the most far-reaching organizational transitions in government history. Our TEAM is now aligned by functional competencies linked across sites. We have drawn on this extensive knowledge base to populate integrated program teams charged with providing full life-cycle support to naval aviation weapons systems. We have tightened our operations and are ready to move full steam ahead – delivering unparalleled support for naval aviation operations worldwide.

### TEAM MAJOR SITES FY91 AND FY99



Integrated Program TEAM (IPT) Building, Patuxent River, Maryland

F-14 Tomcat and crew members on board the USS John F. Kennedy (CV67)

## ACQUISITION REFORM INITIATIVES

Approximately 80 percent of the dollars we manage is under contract in the private sector, which represents a significant target of opportunity for improving the way we do business. We are working with industry to enable reductions in their costs, providing incentives and streamlining our technical and business process requirements.

We are pursuing a variety of Acquisition Reform initiatives which stand to produce tangible benefits for our customers:

Under our *Reinvention Laboratory* authority, waivers were approved in the areas of warranties, non-competitive contract actions and sole source documentation requirements. The warranty policy waiver gives us the incentive to look both within our organization and outside, throughout the Navy and Department of Defense (DOD), for opportunities to advance acquisition process reform. Reinvention waivers have permitted us to tailor weapons systems acquisition documentation, thereby streamlining the review process and enabling us to respond faster to customer requirements.

*Specifications & Standards Reform* led to a substantial decrease in our reliance on detailed product and process descriptions and an increased emphasis on the use of performance based descriptions and commercial specifications. Working with industry contractors and professional associations, we accomplished a 47 percent reduction of military specifications and standards through cancellations, replacement with commercial equivalents and rewrites to performance specifications.

Where possible, we have replaced our traditional, sequential contracting process with a joint government/industry process known as *Alpha Acquisition Contracting*. Alpha Acquisition contracts are prepared, reviewed and negotiated concurrently, and have experienced as much as a 66 percent reduction in time to award when compared to standard contracting processes.

The *Standard Procurement System* (SPS) is an aggressive initiative designed to meet DOD's requirement for paperless acquisition by the year 2000. Intended as the single procurement system to be used throughout DOD, SPS has replaced a number of systems within NAVAIR and provided connectivity throughout the organization. This initiative included the creation of the contracts competency home page for the posting of solicitations, electronic data transfer of data/documents, and computer upgrades to maximize efficiency. SPS is expected to increase the ease and accessibility of doing business with DOD and the Navy.

*Government/Contractor Integrated Test Teams* (ITTs) are composed of government and industry personnel from all activities contributing to the development of complex aircraft and weapons systems. ITTs have increased availability of data for all participants, established a single set of project facts, and enabled the assignment of distinct duties. Moreover, a reduction of flying and testing requirements has resulted through the application of daily planning reviews and test results analyses among both government and industry team members.

*Earned Value Management* (EVM), a major initiative to redesign the management processes at TEAM sites, is an industry best practice endorsed by the General Accounting Office and Office of Management and Budget. EVM employs Activity Based Costing methods to assign actual activity and process costs. This enables us to focus attention on significant cost drivers and redesign target processes to improve efficiency.

The *Single Process Initiative* (SPI), a key component of DOD Acquisition Reform, has enabled us to use performance based specifications and best commercial practices. By the end of 1997, the percentage of major contractors utilizing SPI reached 43 percent, and over 500 process changes affecting such key areas as business practices, quality programs and manufacturing processes were proposed.

As we look forward to 1998 and beyond, we will continue to demonstrate our commitment to Acquisition Reform by expanding existing initiatives and pursuing new opportunities with potential for positive improvement across all elements of the DOD acquisition enterprise.





# TOTAL OWNERSHIP COST

The Department of the Navy has come to realize that our operating forces can no longer afford to be ready at any cost. We live in an age of limited resources, with aging equipment and are required to do more with less. Nearly 85 percent of the aircraft the Department of the Navy owns today will be in operation in the year 2010. It is not surprising that the costs associated with operating, maintaining and supporting these aging aircraft currently represent the largest piece of our naval aviation budget – approximately 60 percent of our Total Obligation Authority.

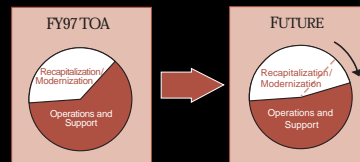
NAVAIR's Affordable Readiness program was initiated in FY96 as a means to understand and reduce life cycle support costs to free resources for investment in modernization and recapitalization. Equally important is our commitment to sustaining full mission capability and safety for all the Fleet's aircraft, engines, components, weapons and commodities.

We have been working with the operating forces to gain a detailed understanding of what drives every element of cost, including inventory (aircraft, engines, spares, support equipment), people, facilities, technical data and processes. This visibility into total cost will show us where we must focus our improvement initiatives to get the biggest payoff for our customer. In addition, we are matching these costs with various performance factors to allow for informed decisions and trade-offs.

In 1997, our major aircraft programs developed detailed Affordable Readiness plans. The plans established specific reduction targets for each cost element, defined the initiatives to reach those targets, and identified obstacles to successful implementation. In addition, each program assigned performance metrics to enable us to track progress. Our initial implementation efforts brought added visibility and interest to total ownership cost among Navy and Defense Department leadership.

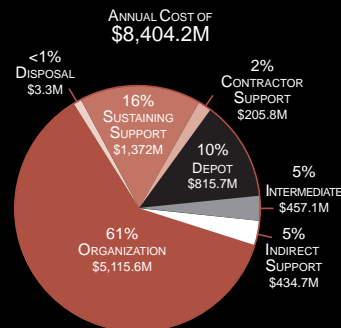
We pursued several Affordable Readiness initiatives including reliability investments; process improvements; new and different support arrangements with the private sector; technology insertion to reduce technical data requirements; improved maintenance through active feedback of in-service experience; cycle time reduction; and Reliability Centered Maintenance – a preventative maintenance program that enables systems to reach their inherent reliability at the lowest total cost. These and other affordability initiatives stand to produce significant savings by revolutionizing the process of in-service support. As an example, a payback of \$404 million over a five-year

## AFFORDABLE READINESS



Affordable Readiness Initiatives are designed to shift the balance of investment in favor of recapitalization and modernization.

## TOTAL COST OF OWNERSHIP ALL T/M/S REDUCTION OPPORTUNITIES



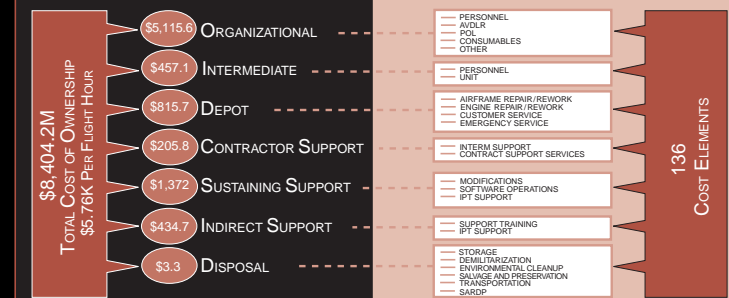
The largest opportunities to reduce O&S costs are within organizational, intermediate and sustaining support. They represent 85% of all O&S costs.

period has already been identified through Logistics Engineering Change Proposals (design improvements in high-cost and high-failure rate items). Another example, Integrated Maintenance Concept, a process designed to improve material condition and reduce depot maintenance costs and out-of-service time, is expected to bring significant savings during the same time frame.

As we enter 1998, our attention will turn to refining our Affordable Readiness plans – to lend greater consistency to the way progress is measured across programs. This

will allow us to anticipate with greater reliability the savings and investment streams for each program, draw comparisons among platforms, and aggregate total savings targets and the resources required to support them. As this report is published, we are developing a web-based tool to quantify and track the progress of our Affordable Readiness initiatives at the program, PEO and Command level. This will allow the programs and NAVAIR leadership to place critical investment dollars against initiatives with the biggest potential for return in both the near and long term.

## COST OF OWNERSHIP - TOTAL FORCE (IN MILLIONS)



As a result of a detailed understanding of our Total Ownership Costs, we have been able to break down the major cost categories to 136 discrete cost elements and identify the factors, both internal and external, that can influence them. This allows all levels of management to target areas for reduction efforts. Keeping an eye on both the "big picture" and the detailed cost element structure will help prevent us from sub-optimizing our efforts and missing potential cost reduction opportunities.

# TOTAL OWNERSHIP COST

## MACRO FUNDING FLOW

The TEAM received \$16.4 billion in FY97, representing a \$0.7 billion increase from FY96 (figure 1). This increase, the first in four years, is attributable to the initial funding of the F/A-18E/F and V-22 programs (figure 2). Naval aviation customers funding was \$12.3 billion. The largest sponsor is Naval Operations (N-88, Air Warfare Division), contributing \$11.1 billion. The remaining \$4.1 billion comes from other Navy as well as non-Navy (Air Force, Army, Foreign Military Sales, etc.) organizations (figure 3). The TEAM recognizes its role as a steward of the funds entrusted to it, and continually seeks opportunities to improve the effectiveness and efficiency

of its use of funds. With its primary role to procure products and services in support of the Navy and the National Defense Strategy, nearly 80 percent (\$13.1 billion) of the TEAM's funds goes to private industry (figure 4). The proportional share of funds allocated to private industry has increased in each of the past four years from 69 percent in 1993 to 80 percent in 1997 (figure 5). This trend demonstrates the TEAM's commitment to the goals of the National Performance Review. The TEAM spent \$3.2 billion on organic products and services, and \$0.1 billion was allocated to other services, agencies, and systems.

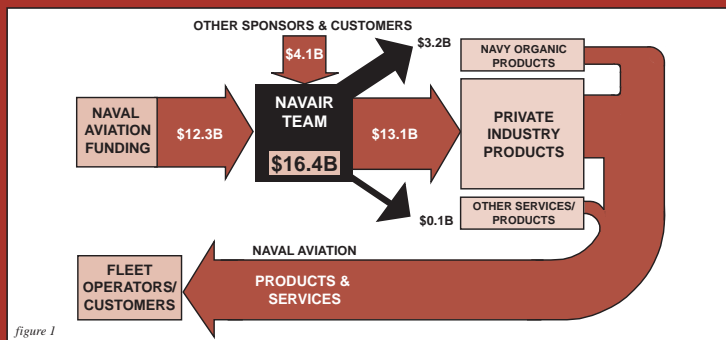


figure 1

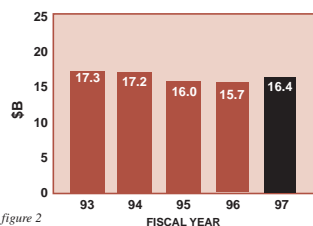
TEAM FUNDING  
(ALL SOURCES)

figure 2

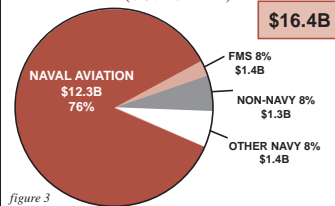
WHERE THE FUNDING  
COMES FROM  
(CUSTOMERS)

figure 3

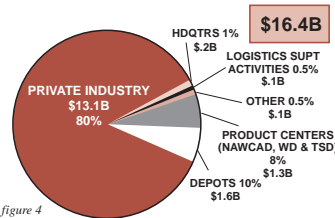
WHO GETS THE MONEY  
(SOURCES OF PRODUCTS & SERVICES)

figure 4

PERCENT OF FUNDS TO  
PRIVATE INDUSTRY

FISCAL YEAR	Percentage
1993	69%
1994	73%
1995	75%
1996	79%
1997	80%

figure 5

## NAVAL AVIATION FUNDING

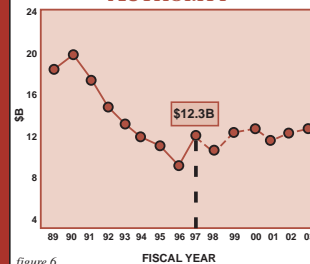
TOTAL OBLIGATION  
AUTHORITY

figure 6

Naval aviation Total Obligation Authority for FY97 was \$12.3 billion (figure 6). Naval aviation appropriated funds consist of the following: Aircraft (APN), Weapons (WPN), Research Development Test and Evaluation (RDT&E,N), Operations and Maintenance (OMN), and Other Procurement (OPN) (figure 7).

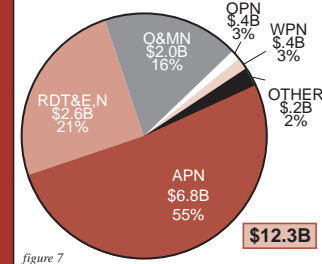
FY97 APPROPRIATED  
FUNDS

figure 7

There have been reductions in appropriated funds since 1989, the largest (84 percent) in the Weapons Procurement fund. The total overall reduction for all appropriated funds was 37 percent (figure 8).

In 1997, the combined efforts of private industry and government provided the major products listed below (figure 9).

FY89-97  
APPROPRIATED FUNDS  
PERCENT REDUCTIONS

AIRCRAFT	-38.5%
WEAPONS	-84.0%
OPERATIONS & MAINTENANCE	-34.4%
RESEARCH, DEVELOPMENT TEST & EVALUATION	+0.8%
OTHER	-43.9%
<b>FY89-97 TOTAL % REDUCTIONS</b>	<b>-37.4%</b>

figure 8

FY97 MAJOR  
PRODUCTS DELIVERED

112	NEW AIRCRAFT
1,119	GUIDED MISSILES
317	AERIAL TARGETS
359	AIRCRAFT OVERHAULS
1,181	ENGINE OVERHAULS
113,855	COMPONENT REPAIRS
317	BULLETINS
8,238	CONTRACT ACTIONS

figure 9

## OPERATIONAL EFFICIENCY

Since the end of the Cold War, DOD has reduced its work force in anticipation of fewer major threats. While the risk of superpower conflict has been reduced, the number and frequency of smaller regional conflicts has increased. The tables presented below represent the workload and work force reductions occurring since FY90.

Notably, the reduction in work force has occurred more rapidly than the reduction in workload. Thus, fewer people must perform the duties and responsibilities necessary to maintain and support a ready force (figure 10).

### CUSTOMER ORDERS AND WORKFORCE

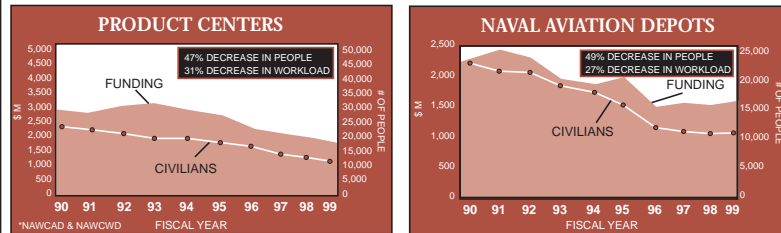


figure 10

There have been significant reductions in overhead at the Depots and Product Centers, partially attributable to the closing and consolidation of sites as part of the Base Realignment and Closure Act. The TEAM continually seeks opportunities to

reduce the cost of operations without sacrificing quality or service. As opportunities continue to arise, the TEAM will implement additional initiatives aimed at further streamlining costs (figure 11).

### OVERHEAD COST TRENDS

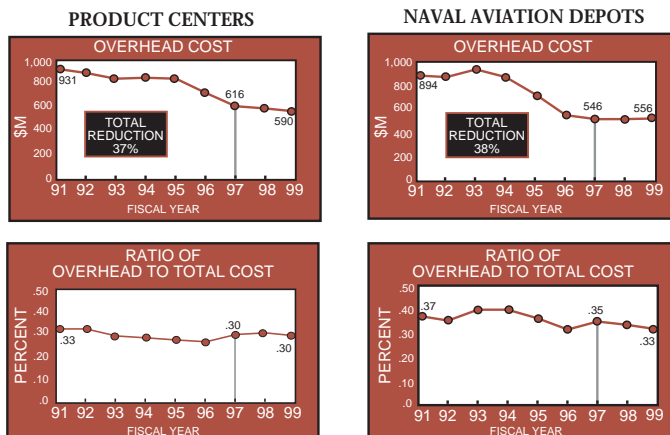


figure 11

Data represents FY98 constant dollars, and budgeted numbers are based on the FY98/99 President's budget.

## OPERATING RESULTS

Overall, the TEAM plans to operate the Naval Aviation Depot and Product Center Working Capital Fund at a break-even point. However, workload fluctuations may result in minor surpluses or losses from year to year. To compensate for this, the TEAM adjusts rates for services accordingly and recoups for sufficient reimbursements to bring the fund back to a break-even level. During FY97, both the Product Centers and the

Depots operated within one percent of planned activity levels. Another way we measure results is through turn around time (TAT) and unit cost. For example, on the E-2C, both TAT and Unit Cost have been reduced 54 percent and 37 percent respectively since FY93. The implementation of the Program Depot Maintenance Schedule System (PDMSS) has proven to be a very successful tool in saving time and money (figure 12).

### E-2C SDLM PERFORMANCE

FY93-FY98

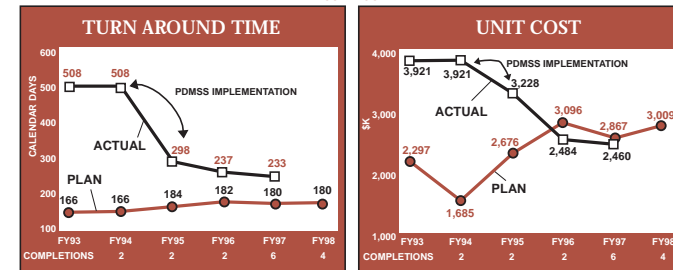


figure 12

## OUR FINANCIAL FUTURE

Fundamental financial reform is occurring throughout the government, driven by both need and opportunity. New laws mandate the creation of a framework for fiscal and management reform: the Chief Financial Officers Act, the Government Performance and Results Act, the Government Management Reform Act, the Information Technology Management Reform Act and the Federal Financial Management Improvement Act.

Across the TEAM, we are moving toward compliance, setting performance goals through strategic planning. We are currently measuring the processes and activities that contribute to the cost of our products, and are changing our management culture to focus on understanding where the money is spent and exactly what it buys our customers – the value it provides.

Building on that knowledge, we will develop a framework of financial metrics in order to manage our resources and measure the results as a corporation. Key financial metrics will monitor trends in: inputs (sources of funding applied to products and services);

processes (operational efficiency and results); outputs (number of products and services delivered); and outcomes (product/service attributes, such as readiness, safety, improved performance and reliability).

We realize that establishing accurate, meaningful financial metrics takes discipline and coordination. This is what our customers and our public expect from us. Our goal is to continually refine and increase the fidelity of these measures, so that we can demonstrate with confidence, savings and cycle time deductions in a manner our customers can recognize and appreciate.



## FUTURE OUTLOOK

As indicated in this Annual Report, we have accomplished a great deal throughout the last year. We will continue reaching for higher levels of performance and quality as we look forward to 1998 and beyond. We will remain committed to delivering our developmental programs on cost, on schedule, and meeting the performance objectives our customers expect. We will continue to work with the Fleet to understand their needs and gain concurrence on desired outcomes for our Navy's future. And we will expand our implementation of Affordable Readiness initiatives to uncover savings for new and improved systems while maintaining optimum readiness.

We are committed to running our organization as an efficient business, getting the most for every dollar invested. To that end, we established a command-level Corporate Business Office (CBO) this year to focus attention on our most critical business issues and provide the TEAM's executive leadership with business-based research and analysis to support informed decisions. The CBO is working with representatives from our sites and functional areas to integrate business strategy, planning and execution across the TEAM.

Using Activity Based Management, we will gain an accurate understanding of where our money is spent and exactly what it buys our customers – the value it provides in a context our customers can clearly recognize. With this information in hand, we will be able to take positive steps to improve our key processes and to reduce the cost and time required to get quality products in the hands of our operating forces.

We have evolved through a turbulent period of closures, reorganizations and transitions. That behind us, we are ready to focus our full attention on what matters most – the dedicated and courageous men and women of our Navy and Marine Corps. We will make sure they are ready and able to enter harm's way, perform their mission and return safely home. We have done well by them, but we recognize our obligation to do better. We have the skills and talent equal to any challenge. We have the commitment. Together, the members of the Naval Aviation Systems Team will elevate our business to world class status. We will do this on behalf of our customers, our Navy and our national defense.

USS *Kitty Hawk* (CV-63)

## FUTURE OUTLOOK



## NAVAL AVIATION SYSTEMS TEAM SITES:

Naval Air Systems Command  
Commander, NAVAIR  
Program Executive Officer (Cruise Missile and UAV Joint Project)  
Program Executive Officer (Joint Strike Fighter)  
Naval Air Warfare Center Aircraft Division  
Naval Air Warfare Center Weapons Division  
Naval Aviation Depot North Island  
Naval Aviation Depot Jacksonville  
Naval Aviation Depot Cherry Point  
Naval Aviation Inventory Control Point (NAVICP)

<http://www.navair.navy.mil/>  
<http://www.navair.navy.mil/air00/index.html>  
<http://www.peocu.js.mil/>  
<http://www.jast.mil/>  
<http://www.nawcad.navy.mil/>  
<http://www.nawcwpns.navy.mil/>  
<http://www.nadepni.navy.mil/>  
<http://www.nadjx.navy.mil/>  
<http://www.nadepcp.navy.mil/>  
<http://www.navicp.navy.mil/>

## DEPARTMENT OF DEFENSE SITES / DEPARTMENT OF NAVY:

Secretary of Defense  
Defense Link  
Under Secretary of Defense for Acquisition & Technology  
Defense Technical Information Center  
Secretary of the Navy  
  
US Navy Welcome Aboard  
Assistant Secretary of the Navy for Research Development & Acquisition  
Chief of Naval Operations

<http://www.defenselink.mil/osd/>  
<http://www.defenselink.mil/>  
<http://www.acq.osd.mil/ousda/gansler.html>  
<http://www.dtic.mil/>  
<http://www.chinfo.navy.mil/navpalib/people/secnav/secnavpg.html>  
<http://www.navy.mil/>  
<http://www.hq.navy.mil/rda/>  
<http://www.chinfo.navy.mil/navpalib/organization/org-cno.html>  
<http://www.acq-ref.navy.mil/>  
<http://www.doneio.navy.mil/>  
<http://www.chinfo.navy.mil/navpalib/allhand/ah-tops.html>  
<http://www.erols.com/dutrauch/>  
<http://www.history.navy.mil/branches/nhcorg5.htm>  
<http://www.usni.org/Proceedings/PRO.htm>  
<http://www.history.navy.mil/>  
<http://www.navy.mil/nol/>  
<http://www.nrl.navy.mil/>  
<http://www.tql.navy.org/>  
<http://www.usmc.mil/>  
<http://www.navyleague.org/>

Navy Acquisition Reform Office  
Navy Chief Information Officer  
ALL HANDS - Magazine of the US Navy

Association of Naval Aviation  
Naval Aviation News Magazine  
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Navy Historical Center  
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Navy Research Lab  
Navy TQL Office  
US Marine Corps Home Page  
US Navy League



## NAVAL AVIATION SYSTEMS TEAM ANNUAL REPORT

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